TECOM Discovery Control Panel Installation and Quick Programming Manual

P/N MAINST-TSX10000 • REV v1.4 • ISS

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This equipment is compliant with Class A of EN 55032. In a residential environment this equipment may cause radio interference in which case the user may be required to take adequate measures.

Contact information

For contact information, see www.aritech.com.au

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Important information

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Installation in accordance with this manual, applicable codes and the instructions of the authority having jurisdiction is mandatory.

The customer is responsible for testing and determining the suitability of this product for specific applications. The customer is responsible for testing the product at least once every three months.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, KGS Fire and Security Australia Pty. Ltd. assumes no responsibility for errors or omissions.

Agency compliance

The TECOM Discovery product range displays the RCM mark as evidence of conformance with requirements set by the Australian Communications and Media Authority (ACMA).

Compliance with the RCM labelling requirements has been demonstrated by testing the product in representative installation configurations to various Australian and New Zealand Standards as listed in Appendix A.

In addition to the necessary regulatory requirements, the TECOM Discovery product range has also been evaluated in representative installation configurations and proven to be compliant with various EMC Immunity requirements as listed in Appendix A.

Contact information

For contact information, see https://www.aritech.com.au

Preface

This manual covers the installation of the Discovery product range and power supplies in new and existing environments. Please review the sections related to the products being installed and the specific installation environment to ensure that items related to system performance and safety are addressed.

The product name “Discovery” will often be used in this manual.

The *TECOM Discovery Installation and Quick Programming Manual* is for installation technicians to install, program and commission a Discovery panel.

Refer also to other Discovery manuals in the suite:

- The *TECOM Discovery Administrators Manual* is for user’s and system administrators who need to manage the Discovery system via its text-based user interface (via the User menu).
- The *TECOM Discovery User’s Manual* is suitable for most users of the Discovery system to perform everyday tasks.

Notes:

- The permissions assigned to you may not allow you to do everything described in this manual. You may not be able to see all menu items described in this manual.
- A trained Technician, complying with all applicable codes, should perform all required hardware installation.

Product overview

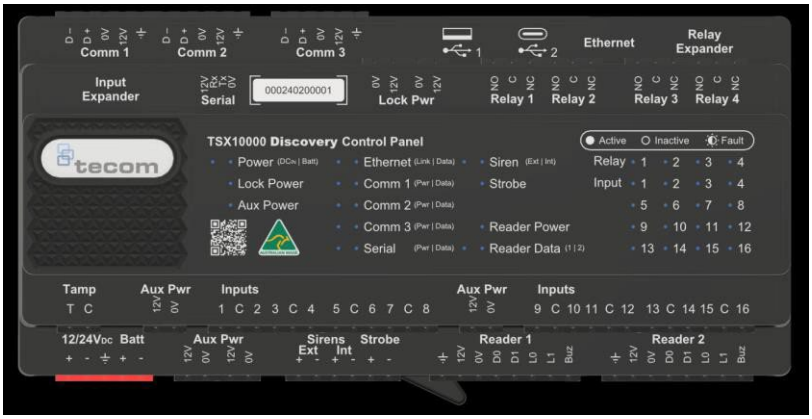


Figure 1: TECOM Discovery Control Panel

The TECOM Discovery Control Panel is a scalable intrusion detection and access control system.

Key TECOM Discovery Control Panel features and benefits include:

- Supports TECOM Challenger system components and peripherals
- DIN rail mounting (DIN adaptor kit for existing enclosures)
- 12 / 24 VDC primary power supply
- 8 individually fused power outputs supporting 3A of peripheral load
- 2 siren and 1 strobe outputs
- 16 on-board alarm inputs
- 4 general purpose relays (e.g., doors)
- Expansion port for additional relays
- 3* LAN (RS485) busses supporting existing and new TECOM high speed protocols
- 2 reader terminals supporting Wiegand and OSDP* protocols
- All LAN and OSDP ports have on-board protected, SW controlled termination
- Ethernet NIC
- 2 USB host ports for additional communications (4G / 5G / Wi-Fi / 2nd NIC)*
- STU interface
- I/O status indication LEDs
- Web browser for configuration options

* Certain functionality will be available in the future by firmware updates.

Product contents

The package contents for the products covered in this manual are given in the table below.

Inspect the package and contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately.

Table 1: TSX10000, TECOM Discovery DIN module shipping list

Qty	Item
1	TSX10000 TECOM Discovery Control Panel
7	Black 2-way plug-on screw terminal connectors
4	Black 3-way plug-on screw terminal connectors
1	Red 5-way plug-on screw terminal connectors
3	Black 5-way plug-on screw terminal connectors
5	Black 6-way plug-on screw terminal connectors
2	Black 8-way plug-on screw terminal connectors
1	Resistor, 1k 5% 250mW 0.4” axial
32	Resistor, 10k 5% 250mW 0.4” axial
1	Battery Lead Fused, 8A T, 800mm
1	Label for enclosure

Table 2: TSX10000-UPGKIT, TECOM Discovery Upgrade Kit shipping list

Qty	Item
1	TSX-DINRAIL (DIN rail for existing TS0307 enclosures)
1	TSX10000-PSU1 (24VDC 120W Standalone Power Supply)

Latest versions of the manuals are all available online at:
https://bit.ly/tecommanuals

Before you begin

This section contains items that govern the installation of the TECOM Discovery Control panel.

When installing a Discovery control panel, or any other parts of the system, you need to be aware of requirements for installation location, cabling and earthing, and plan accordingly.

NOTICE! A trained service person must perform all required hardware installation in compliance with all applicable codes.

Disclaimer: This manual contains requirements based on Australia and New Zealand codes. It is not an authoritative reference regarding codes and has not been reviewed by the responsible authorities. Codes applicable to your specific installation district or installation environment may not have been considered or included. The codes may change and may not be reflected in this document.

Safety Warnings

The enclosure protective earthing supplementary safeguard is not effective until the equipment is connected to the building earth via the mains plug or a direct wired connection.

Field wiring errors or damage may present hazardous voltages inside the enclosure. Treat all wires and boards in the enclosure as hazardous until checked and validated as safe.

KGS Fire & Security Australia Pty. Ltd. recommends the use of personal protection equipment, such as gloves, glasses, voltage detectors and meters for all installation and maintenance operations.

Take appropriate precautions if working on an active or recently de-powered device.

The circuit board and the heatsink on older TECOM bare circuit board products may be hot.

Do not touch.

Discovery compatibility with past power supplies

AC operation via TECOM Challenger device power supplies is not supported. Discovery is compatible with a nominal 12 VDC or 24 VDC source.

ChallengerPlus interfaces not used on Discovery

The following hardware interfaces available on ChallengerPlus are not present on Discovery:

- The on-board plug-in expansion ports
- The analogue phone interface
- The SD card socket for backup and restore

Discovery Compatibility with prior TECOM hardware

Whilst Discovery is compatible with most peripherals developed for legacy ChallengerPlus systems, customers are advised that support for V8 Door and Lift Controllers (TS0866, TS0867, and TS0869) is not available in the Discovery platform. Please refer to the 2022 article available here https://www.firesecurityproducts.com.au/transitioning-into-the-tecom-nac for information on transitioning to supported peripherals. https://support.firesecurityproducts.com.au/hc/en-us

Equipment location

The Discovery control panel location must comply with the Environmental and Mechanical Specifications detailed in Appendix B. The Discovery control panel location must comply with the Environmental and Mechanical Specifications detailed in Appendix B. The Discovery control panel must be installed in a location with restricted access. Access to the installation area should be monitored by the Discovery system and history events generated in the system.

The unit must not be installed in areas where children are likely to be present.

The Discovery system is designed to be fixed in place. When the system is wall mounted, the enclosed unit final weight and access restrictions must be considered when selecting the mounting surface and the fasteners. Additional guidance is given in Minimum Enclosure table on page 63 for wall and rack installations.

Enclosure Access Restrictions

According to the requirements of AS/NZS 62368-1, the interior of the enclosure presents hazards to general users and thus physical access restrictions must be instituted to ensure safety. To comply with the requirements related to safety:

- Access to the interior of the Enclosure must be limited to suitably trained and qualified installation and maintenance technicians.

- Access to the interior of the enclosure must require the use of a tool.

These restrictions can be met by implementing one or more of the following options:

- Fit a lock to the enclosure. Ensure that it is always locked when not under the immediate control of suitably qualified technicians.
- Seal the enclosure door using standard head (non-knurled) screws, firmly tightened.
- When using finger operable screws (knurled head, etc) to seal the enclosure door, tighten to 2Nm (typically >1/4 turn beyond the finger tight point).

Installing the TECOM Discovery Control Panel

Installation guidelines

Installers must adhere to any country dependent requirements and local applicable standards. The installation environment must comply with environmental specifications of all modules fitted inside the enclosure.

Installation location requirements are provided in the Equipment location

section on page 9. Some of these are new and as a result retrofit installation locations may no longer be compliant with current safety standards.

Specifications and guidelines regarding the Discovery module, enclosures, batteries, power supplies and wiring are given in the Product overview section on page 6. They cover key requirements for standard and bespoke configurations of the enclosure and power sources. Further details and explanatory notes are provided for all module connection on page 31 and installation activities below.

The specific installation configuration must comply with all applicable entries in the specifications table and the detailed notes below.

All wiring internal to the enclosure, and all mains wiring, must be brought into compliance with the latest applicable wiring standards at the time of installation.

Newer electrical codes generally require that a power disconnect device be present close to the enclosure; for mains powered installations this is typically the GPO.

Installation procedure

Enclosures - general

The TECOM Discovery Control Panel must be installed in an approved, compatible enclosure, as detailed in the Minimum Enclosure Requirements table on page 63.

Install equipment in a clean environment and where environmental conditions are within the range specified for each module in the enclosure.

Installation in the open (without a surrounding enclosure) is unlikely to be compliant and has not been considered in the certification process.

Custom enclosures must comply with the minimal requirements as per the Product overview section on page 6. When mounting on equipment rack shelves or drawers, additional concerns are raised for wiring and ventilation, especially when other equipment shares a sealed rack enclosure. Forced air cooling may need to be provided. The installer is responsible for determining their suitability

for the installation scenario at hand according to local codes, customer demands, ambient environmental conditions, and system requirements.

Enclosure location and mounting – New installations.

In a new installation, the empty enclosure is located and mounted on to the supporting surface following the procedure in the specific enclosure installation manual.

The enclosure as mounted is not earthed, so field wiring should not yet be pulled into the unit.

Enclosure location and mounting – Retrofit installations.

Retrofit installations should be reviewed prior to proceeding to ensure that the environment is still suitable for use and that the integrity of the existing enclosure and wall mounting arrangement is sound and suitable. Since the introduction of the Challenger systems, and the installation of the unit being updated, safety standards have improved, room usage may have changed, the thermal load in the room may have significantly increased or the enclosure mounting may have been damaged. Refer to the Equipment location section on page 9 for specific requirements.

Prior to working on the unit:
Validate the integrity of the enclosure earth. Be aware that during the upgrade process, the metal enclosure will be unearthed until the works are completed. The additional safety precaution of providing temporary earthing to the enclosure during the wiring transition may be taken if deemed necessary by the qualified installer.

Ensure that cables entering the enclosure are not carrying dangerous voltages.

Identify any potential hazards and make them safe; The front door should be removed from the enclosure prior to working on the unit. The system should be de-powered, and the battery removed and safely stored when moving or modifying the enclosure, mounting new hardware or re-wiring the system.

Before drilling into a wall or fitting self-drilling screws, consider cables, voids, studs, and other hazards that may be behind the wall face.

Ensure that all necessary access codes are known and that the procedures for taking the system off-line are followed. Take adequate notes and photos to ensure that the transfer of wiring between the old and new system can be successfully completed.

Enclosure preparation

Adequately record and mark all cables connected to the existing Challenger panel in preparation for reconnection to the new module.

The existing blue Terminal Block plugs are not compatible with the Discovery system and will need to be changed over.

Once connections are annotated, the existing Challenger panel should be disconnected and removed from the enclosure, along with its mounting hardware.

Proceed as follows:

a) Locate the GPO planned to power the unit. Ensure that the mains lead is at least 20cm longer than what is necessary to reach the GPO from the lower left corner of the enclosure considering the planned path, restraints, and applicable codes (the length of the captive mains lead is specified in the Product contents section on page 7).

b) Power down the system and remove the door and battery from the enclosure.

c) Unplug the AC plug pack powering the existing ChallengerPlus system. Disconnect and remove its low voltage cable from the system.

d) Pay attention to cable duct glands fitted to the top of the enclosure and wiring entering from the rear; release retaining nuts, cable ties, etc to allow adequate movement of the enclosure without damaging existing wiring or conduits.

Maintain control of the plug end; do not allow it to be connected to the mains prior to the completion of all power supply wiring.

NOTICE! In case of a worn, pinched or otherwise damaged mains lead, the power supply module must be replaced in order to avoid hazard.

DIN rail mounting

Locate the supplied DIN rail as shown and locate the inner tabs of the DIN rail, slot DIN rail into the cable tie loops in the base of the enclosure. Secure the rail with the supplied self-drilling screw.

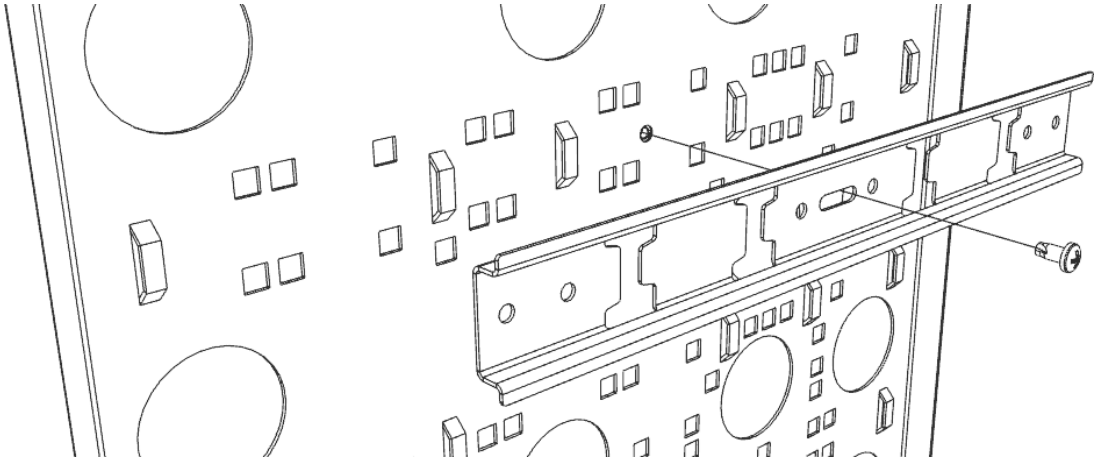


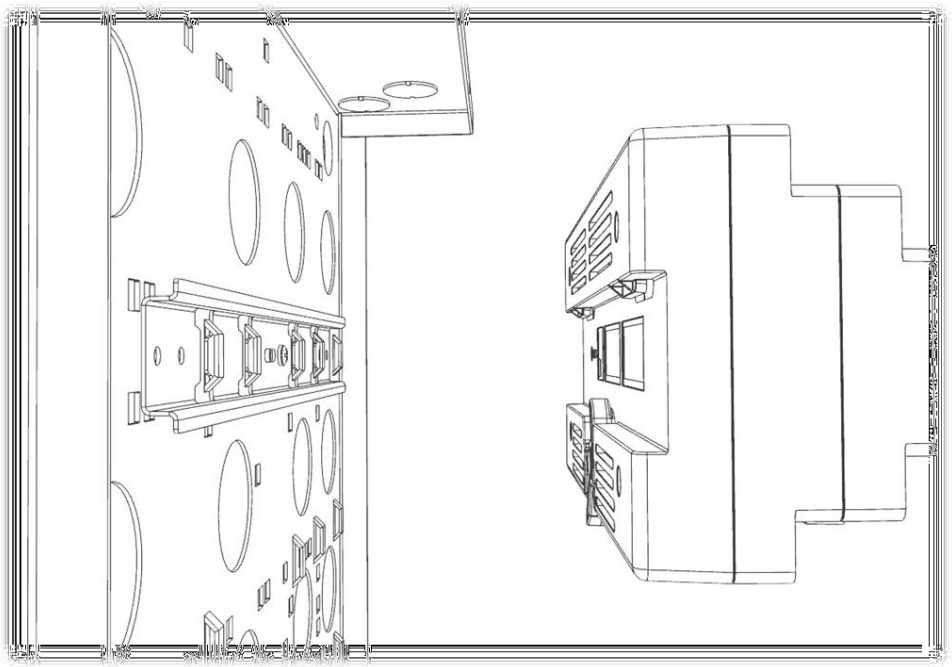
Figure 2: DIN Rail mounting

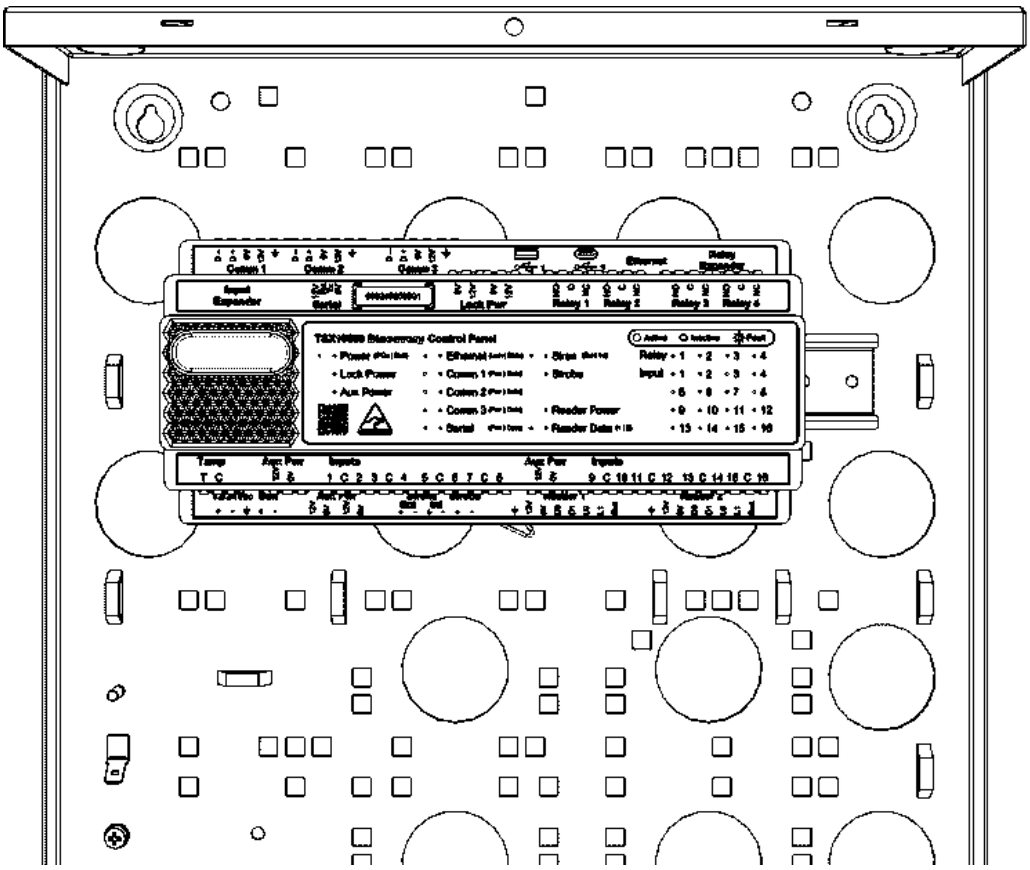
Discovery module mounting

Locate the Discovery module approximately in the centre of the DIN rail, hooking the upper section over the rail, and securing in place using the latching clip; removal follows these steps in reverse.

Notice: The Discovery module should not be mounted until the earth; power supply and system wiring has been routed into the enclosure.

Figure 3: Discovery module mounting.





Discovery System Cabling requirements

General

- Enclosure cut-outs are provided in the rear face to allow cable entry through the mounting wall. Some enclosures also have cut-outs in the top and/or bottom faces provided for cases where it is not practical to trunk cables via wall cavities.
- Circuit separation, conduit materials, and workmanship must comply with all applicable codes. All wires entering the enclosure should be tied near point of entry. Avoid loops of wire.
- Route cables so that they do not lie on top of any device. Do not route wires underneath any bare PCB modules. Use cable ties to improve neatness of wiring.
- Connectors used on the Discovery module are not compatible with earlier products. Wires must be re-terminated to the new connectors supplied with the module. When re-terminating, do not re-use the stressed portion of the wire; cut it off and strip a fresh section of wire to terminate.
- The Electrical specifications section in Appendix C provides details on connecting terminals, necessary wire ratings and specifications.

Discovery system earthing

The following requirements are essential to the reliable operation of the Discovery system and its devices.

Safety earth bond

In configurations where ES2[1] and ES3[2] rated circuits enter an enclosure, metal enclosures and all separate externally accessible metallic parts (doors, access panels) require a safety earth bond.

The enclosure safety earth bond should be in compliance with applicable codes, as confirmed during the enclosure installation.

The Discovery module and peripherals are not rated to carry earth currents and must not be used as safety earth junctions or bonds.

The external 12VDC or 24VDC sources will require enclosure safety earth and bonding points to be provisioned by the installer.

Functional earth connections

Discovery series controllers have a module earth terminal between the power and battery terminals. These functional earths must be connected to a safety earth bonding point inside the enclosure; the enclosure earth tab is suitable. Further functional earth connections can be daisy chained or star connected from the initial point.

Earthing of one cabinet containing several devices. Legacy TECOM peripheral devices designed for the system have earth connections via metal studs; later generations of Challenger products and the Discovery series controllers have a module earth terminal between the power and battery terminals. These functional earths must be connected to a safety earth bonding point inside the enclosure; the enclosure earth tab or the tabs on the power supply bracket (when fitted) are suitable. Further functional earth connections can be daisy chained or star connected from the initial point.

Ground or Earth links. Legacy TECOM peripheral devices have an earth lug (or stud) on the PCB and are fitted with a link labelled “GND” or “EARTH.” In such cases, the device’s GND or EARTH link must be removed. When configured correctly, there will be a resistance value greater than 100 k Ω between the device’s earth lug (or stud), or power earth terminal, and any “C” or “0V” terminal on the device.

Earthing of panels in a single building. In a single building several cabinets or devices are locally bonded to the building earth. A licensed electrician should check the integrity of the building earth system.

Earthing of panels in more than one building. If the wiring extends to separate buildings, use more than one common earth system. Install LAN isolation devices, such as TS0893, TS0894 or TS0896 isolation Interface modules to

isolate the system LAN between buildings to protect the system against differences in earth potential and/or to extend distance. See Figure 5 page 19.

Earth considerations for system interconnects

Discovery system LAN and power cabling is not rated to carry earth currents and cannot be used as a substitute.

Inadvertent connections can place the functional earth in parallel with the building earth, possibly forcing high currents through the Discovery system components and wiring resulting in damage to the system.

Discovery modules provide a functional earth terminal at each LAN port. TECOM Challenger products require that the cable screens be wired back to the PCB earth screw(s).

The system cabling requirements for functional earth are as follows:

- TECOM Discovery modules or legacy TECOM peripheral devices housed in a metal enclosure with a safety earth connection can ONLY be the source of a functional earth. They MUST NOT be connected to other functional earth sources in the system.
- Discovery modules distribute functional earth with the LAN shield to facilitate connections. (One end of the shield)
- All modules in a Discovery system must be connected to a local safety earth or the distributed functional earth.
- When a LAN is connected to a module with a local connection to earth, the LAN cable shield is not connected to the module at this point, but it also is not broken – it continues to the next destination.

Examples of these connection scenarios are shown in Figure 6RS-485 LAN and earth system block diagram on page 22.

Discovery RS-485 LAN cabling

The cabling requirements for RS-485 LANs are:

- Use 2-pair twisted shielded data cable such as Belden 8723.
- The screen of the RS-485 cable is connected to the system functional earth (not the 0V terminal). Specific interconnection guidance is provided in the preceding section.
- An RS-485 connection requires a 0V reference. This wire is run inside the screened cable. It is connected to the black wire of the red-black pair.
- Traditionally, the green-white pair is used for data: D+ on white and D- on green.
- The copper resistance of 0.325mm^2 (AWG22) wires may limit maximum bus length to <1km. Conductors with larger cross-sectional area are recommended for long buses.

- The length of copper LAN cable should not exceed 1.5km. LAN isolation devices can be used to extend the distance and are typically cheaper than long copper runs.

RS-485 LAN configurations

RS485 LANs may be configured in a variety of ways:

- Straight LAN, where the Discovery panel is at one end of a LAN cable run.
- Star LAN, where multiple LAN cable runs are used in a branched configuration.
- Multi-building, where the LAN extends to more than one building.

Straight LAN

In a straight configuration (Figure 6 on page 22), the LAN wiring runs directly, point to point between connected modules. Straight configurations may require additional wire and installation time compared to other wiring options but support higher data rates for the effort.

Stubs, if present, are kept short, preferably totalling < 10% of the overall main-line length.

The Discovery or TECOM modules at the start and end points of the LAN are terminated, all others are not.

This is the only configuration compatible with Discovery's high speed operating mode*.

Star LAN

Star LAN configurations trade off communications speed for simpler or shorter overall cable length.

In a star configuration, the LAN has at least two branches (Figure 4 page 19) optionally connected via a TS1044 Power Distribution Board (see “**TS1044 Power Distribution Board** below).

The termination would be ON for the two devices at the ends of the two longest cable runs. In some cases, additional terminations at additional long ends of junctions may benefit.

Star configurations are not compatible with high-speed operation*.

***** High speed LAN will be available in the future with firmware updates

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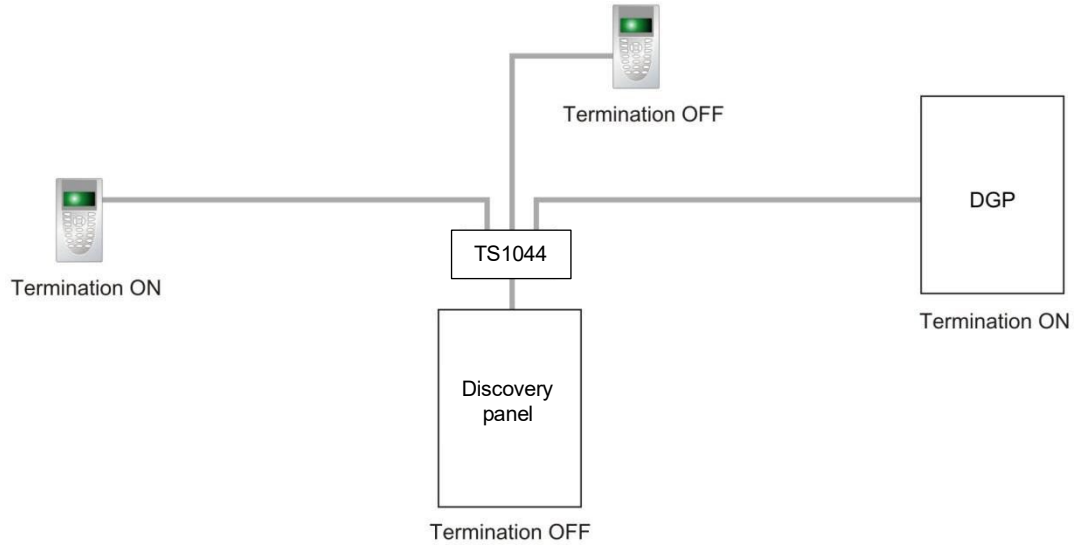
Note: A star LAN configuration may consist of a number of cable runs (branches). LAN termination should be ON only at the devices at the far ends of the two longest branches. A star LAN that has multiple branches in excess of 100m may need to use LAN isolation devices such as TS0893 LAN Isolation Interface modules to isolate the LAN segments that do not have LAN termination set to ON.

Figure 4: Star LAN configuration



Multi-building or long-distance LAN cabling

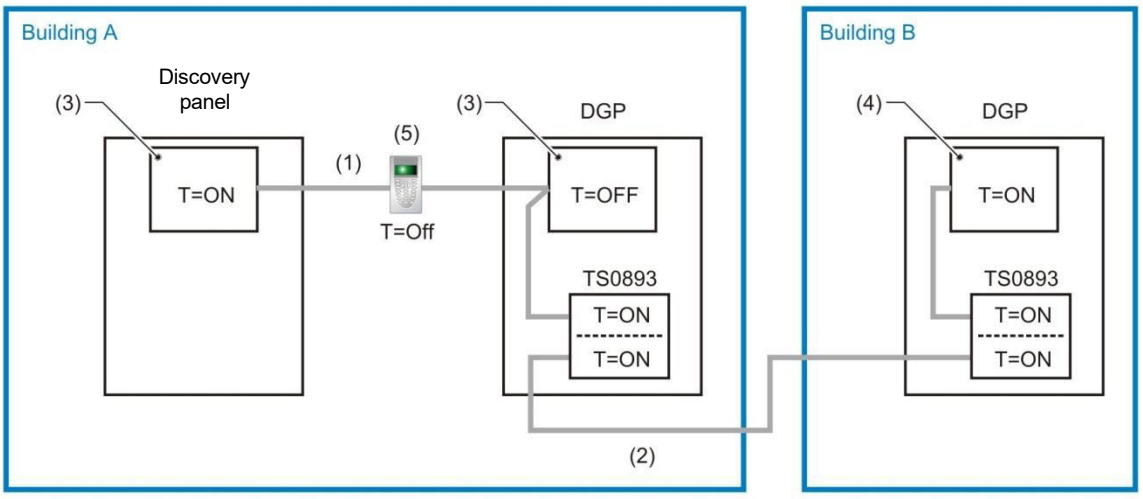
If the RS-485 LAN extends to more than one building, each building must have its own earth system. LAN isolation devices, such as TS0893 LAN Isolation Interface modules, are used to isolate the system LAN between buildings to protect the system against differences in earth potential.

This is not strictly a LAN wire configuration. LAN isolators can be used with both star and straight LANs. The available TECOM isolators are only compatible with Challenger RS-485 networks.

The LAN isolator is treated as is any other device on the local LAN; the isolated remote LAN does not impact local LAN operations.

Figure 5 below shows the use of two TS0893 modules to extend the RS-485 LAN across two electrical installations. Each TS0893 module has a pair of termination links, used to terminate (if applicable) the LAN segment on each side of the module's isolation barrier.

Figure 5: RS-485 LAN cabling between two buildings



T = termination

Figure 5 Legend

Item	Description
1.	LAN segment 1 extends from the Discovery panel to one side of the TS0893 LAN Isolation Interface. Termination is ON at the panel and the panel's side of the TS0893. Maximum cabling distance for segment 1 is 1500 metres.
2.	LAN segment 2 extends from the TS0893 in building A to the TS0893 in building B. Termination is ON at both TS0893 modules. Maximum cabling distance for segment 2 is 1500 metres.
3.	Earth point on remote device connected to building earth via plug pack earth wire (green), or earth wire from local power supply.
4.	Plastic-body LAN device. Join data cable shields where cable extends past a device that does not have a LAN earth connection.

RS-485 LAN termination

Each Discovery LAN port has an on-board software configurable 120 Ω termination that is protected from overload and preserves its setting independently of module power.

TECOM Challenger devices and LANs use 470 Ω LAN termination resistors, setting the impedance of the LAN to around 220 Ω when correctly terminated. The termination resistor may be external or onboard (devices with an onboard resistor use a link or a DIP switch to set the LAN termination to ON).

A Discovery LAN should have only two devices with the LAN termination set to ON (or the LAN termination resistor fitted).

The Discovery 120 Ω termination is compatible with Challenger RS-485 LANs.

In a completely connected (but powered down) system, you can check for correct LAN termination by measuring the resistance across the Discovery panel's D+ and D- terminals. The values below are for AWG22 cable runs < 50m where up to 10 Ω of cable resistance is present; longer runs require cable resistance to be considered more carefully.

- 60 Ω indicates a correctly terminated high speed or Challenger RS-485 LAN with 2 x 120 Ω resistors.
- 90 Ω indicates a correctly terminated Challenger RS-485 LAN using a 470 Ω and a 120 Ω resistor.
- 220 Ω is a correctly terminated, 2 x 470 Ω Challenger RS-485 LAN.

If the above values are not met, please Troubleshoot the system below using these examples:

- 0 Ω indicates a short circuit in the cabling.
- Values below ~ 53 Ω indicate excessive termination – 470 Ω and 2 x 120 Ω, 3 x 120 Ω, etc.
- Values between ~65 Ω…87 Ω indicates excessive termination, eg: 2 x 470 and 1 x 120 Ω resistors, etc.

- Values between ~95 Ω…210 Ω indicates excessive Challenger RS-485 LAN termination, e.g.: 3 x 470 Ω, etc.
- 470 Ω or more indicates that less than two devices are terminated

Diagnosis of suspected faults in long cable runs with simple tools may be facilitated by disconnecting modules and segments at easily accessible points.

Discovery RS-485 LAN options

The Discovery module has 3 primary LAN ports, COMM1, COMM2 and COMM3 and 2 further configurable ports available for reader connections.

Note: Only the LAN ports, COMM1, and COMM2 will be available on first release. The other ports will become available through future firmware updates.

COMM1 is required for system operation and the remainder are optional.

Each LAN must be independently terminated, either through the use of resistors, onboard jumpers/dip switches, or using the new electronic termination on Discovery.

Power supply to RS-485 LAN devices

Devices on the LAN may be supplied from the Discovery module's 12V and 0V LAN power terminals. Use an external 12 V power supply (such as TS0073 2A Power Supply) when:

- The device is more than 100 m (data cable length) from the panel
- Electrical isolation is required
- More power is needed than can be provided by the LANs

When powering a LAN device from an external 12 V power supply:

- Connect the external power supply's '+' terminal to the device's '+' terminal. Do not connect the power supply + to the LAN +.
- Connect the external power supply's '-' terminal to the device '-' terminal.
- Connect the LAN cable black wire '-' to the device '-' terminal.

Warning: Ensure currents do not exceed the LAN cable manufacturer specifications. In general, 1A is the maximum allowed for a compliant installation.

Figure 6: RS-485 LAN and earth system block diagram

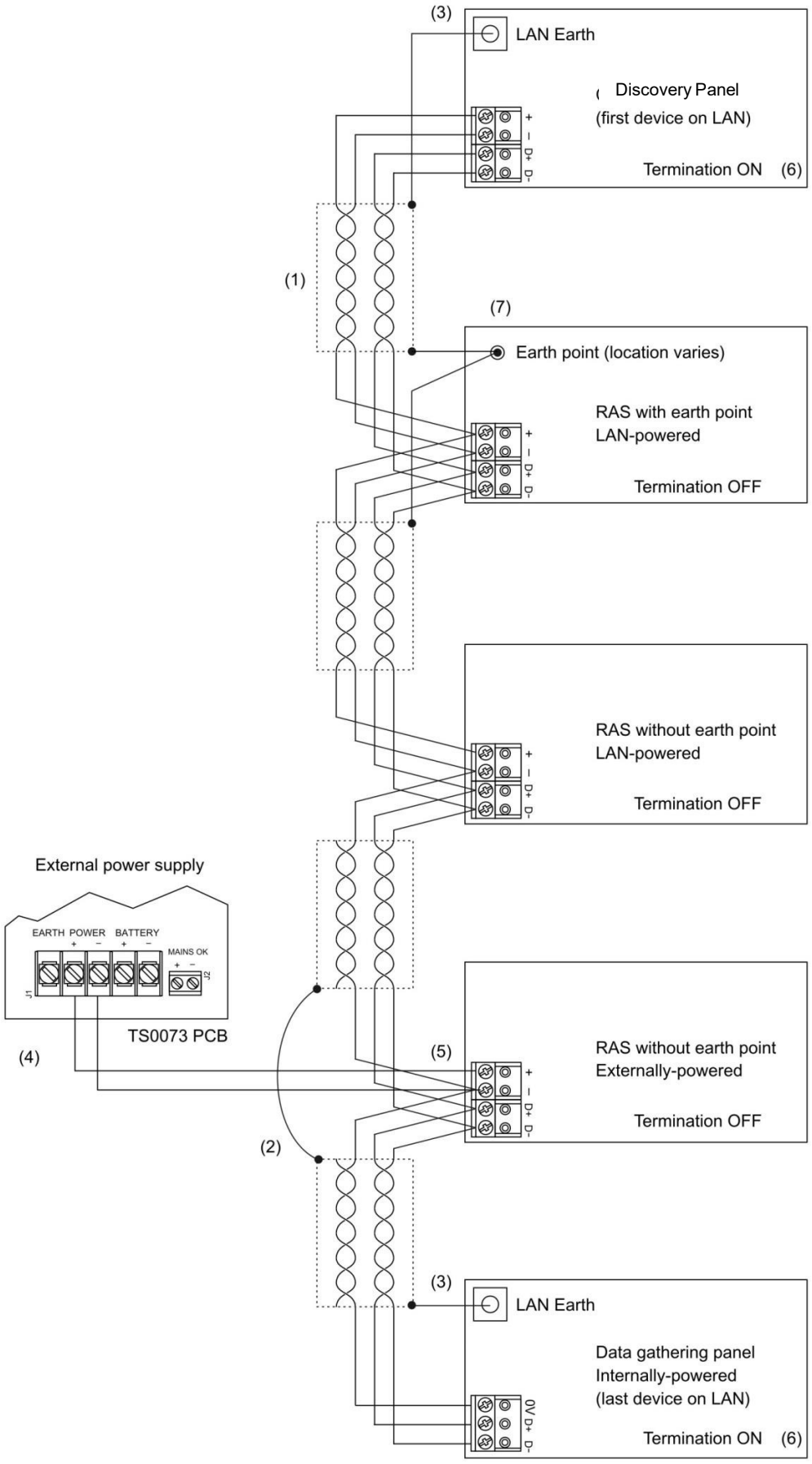


Figure 6: Legend

Item	Description
1.	RS-485 LAN cable. We recommend the use of 2-pair twisted shielded data cable such as Belden 8723 for optimal performance.
2.	Join data cable shields where cable extends past a device that does not have a LAN earth connection.
3.	In each segment of LAN cabling, connect one end only of the data cable shield to a device's LAN earth terminal.
4.	External 12 VDC power supply (if needed).
5.	Do not connect the + from the external 12 VDC power supply to the + of the LAN.
6.	Terminate the control panel and the most distant device, or the devices at the ends of the two longest LAN cable runs, as applicable.
7.	The RAS earth point should typically be connected to the data cable shield. Alternatively, it may be connected to building electrical earth (for example, if mounting to an earthed metal fixture).

Using LAN devices to facilitate cabling

Various LAN devices may be used to provide electrical isolation and to reduce cabling costs. LAN isolation devices can also be used to extend the distance of LAN cabling beyond what can be achieved by a single cable run of 1.5 km. LAN devices include the following:

- **TS1044 Power Distribution Board.** The TS1044 module provides a STAR distribution point that can be used in either data or power mode, depending on the terminals being used. The TS1044 module expands the number of physical connections that can be made to the panel's power or data output terminals.
  - In data mode, each TS1044 module provides five sets of LAN out connections and five sets of + and – auxiliary power output terminals.
  - In power mode, each TS1044 module provides 10 sets of + and – auxiliary power output terminals.

  A TS1044 module is shown in Figure 4 on page 19.
- **TS0893 LAN Isolation Interface.** Provides an optical isolation barrier between components on a Discovery (or Intelligent Access Controller) LAN. The TS0893 can be also used as a LAN repeater; with up to three stages cascaded together to increase the maximum LAN cabling run from 1.5 km to 6 km. TS0893 modules are shown in Figure 5 on page 19.
- **TS0896 RS-485 to Fibre Optic Interface.** A pair of TS0896 modules, with suitable optical fibre cable, may be used to extend the LAN to remote buildings or locations within a building (for example where unused optical fibre cable already exists).

- **TS0098 Challenger IP LAN Adaptor:** Multiple IP LAN Adaptor modules enable Discovery LAN data to be carried over an IP network and to be converted back to RS-485 communications for connection to LAN devices.

Visit the KGS Australia Pty. Ltd. website at www.aritech.com.au for details and images of LAN devices.

Application notes

AC operation via TECOM Challenger device power supplies is not supported.

The Discovery module primary power source can be a nominal 12 VDC or 24 VDC source; specific details are provided in Appendix C.

The Discovery module automatically detects the applied voltage and configures its operating mode accordingly.

Full capability requires 24 VDC. When operating from a 12 VDC source, the on-board battery system cannot charge an attached SLA battery. 12 VDC operation does however allow for higher load currents.

12 V Battery

A TSX10000 Discovery Control panel operating from a 24 VDC supply should be connected to a 12 V battery suitable for the enclosure in use and compliant with the requirements in section TSX10000, Discovery module, power input / output, in Appendix C.

Maximum capability is attained with 12 Ahr batteries; smaller enclosures will only support a 7.2 Ahr battery. Refer to Appendix C for system current draw to determine battery suitability for each installation.

The installer is responsible for identifying and specifying batteries with an operating temperature range commensurate with the specific Discovery installation environment; a minimum range of 0°C to +40°C is recommended.

A fuse is required in the positive lead of each battery, as fitted in the supplied battery leads; a spare is not provided. Replacement fuse specifications are provided on the label on the battery cable as well as section TSX10000, Discovery module, power input / output in Appendix C.

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

The installer is responsible for ensuring that the specified batteries in conjunction with the configured system load and Discovery charger settings provide the required system backup and recharge times.

The installer (or user) is responsible for scheduling on-going battery system checks as required by the applicable standards and codes to ensure user safety, battery integrity and system performance; a 3 monthly interval is suggested.

Auxiliary power terminals

Connect the 12V and 0V auxiliary power output terminals to devices that require 12 VDC power, such as detectors. If you need more connections, you can use a TS1044 board to increase the number of terminals (see “**TS1044 Power Distribution Board** on page 23).

RS-485 LAN

LAN cabling, network layout and capabilities are covered in section TSX10000, Discovery module, power input / output in Appendix C.

Checking LAN performance

Use Install menu option 23 Poll Errors to check for poll errors on the LANs. If the rate of poll errors seems excessive, check the LAN cabling and termination.

Inputs

Zone inputs are also known as alarm inputs. A Discovery system can receive alarm signals from:

- The Discovery panel’s onboard inputs
- Inputs connected to Data Gathering Panels (DGPs)

Note: Input numbers in the range 1000 to 1008 will not report CID alarms.

Each pair of zone input terminals may be connected to an alarm system device, such as a detector or reed switch.

By default, the Discovery system monitors zone inputs for four states (sealed, unsealed, open circuit, and short circuit) when used with two end-of-line (EOL) resistors in each zone input circuit, as shown in Figure 7 on page 27. The default EOL resistor value is 10 k Ω but can be changed for the panel’s onboard inputs via System Options.

Install EOL resistors in zone input circuits at the end of the circuit. If an alarm device is connected, place the EOL resistors at the device’s connections. If a zone input is not used, you do not need to connect an EOL resistor if you program the corresponding input number as type 10 (spare).

Tip: Use sleeves on the resistor leads to prevent accidental shorting.

Depending on the setting of Input Tamper Monitoring in System Options, the Discovery system reports open- and short-circuit conditions in two ways:

- If Input Tamper Monitoring is set to Yes (default), then open- and short-circuit conditions are reported as input tampers. This is known as four-state monitoring.
- If Input Tamper Monitoring is set to No, then open- and short-circuit conditions are reported as unsealed. This is known as two-state monitoring.

The panel uses the circuit’s resistance to determine the state of the zone input.

Table 3 below lists the expected resistance values for sealed (normal) and unsealed (active) states for each EOL resistor option.

Table 3: Resistance values for various EOL resistor options

EOL Resistor Option	Sealed (normal)	Unsealed (active)
10K (default)	10 kΩ	5 kΩ or 20 kΩ
4K7	4.7 kΩ	2.4 kΩ or 9.4 kΩ
2K2	2.2 kΩ	1.1 kΩ or 4.4 kΩ
6K8	6.8 kΩ	3.4 kΩ or 13.6 kΩ
5K6	5.6 kΩ	2.8 kΩ or 11.2 kΩ
3K7	3.7 kΩ	1.9 kΩ or 7.4 kΩ
3K3	3.3 kΩ	1.7 kΩ or 6.6 kΩ
2K0	2.0 kΩ	1.0 kΩ or 4.0 kΩ
1K5	1.5 kΩ	0.8 kΩ or 3.0 kΩ
1K0	1.0 kΩ	0.5 kΩ or 2.0 kΩ
2K2/6K8 (see note below)	2.2 kΩ	9.0 kΩ

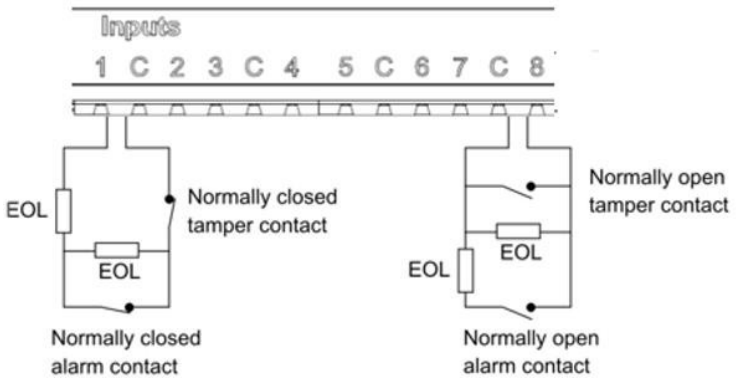
Notes

- Resistance values for open and short conditions are infinity and zero, respectively. If four-state monitoring is used, open and short conditions indicate input tamper. If two-state monitoring is used, open and short conditions indicate unsealed.
- The 2K2/6K8 option is not compatible with alarm devices using normally open (NO) alarm contacts and will result in the input indicating unsealed when it is sealed.

The following diagrams indicate the placement of EOL resistors in typical Discovery zone input circuits.

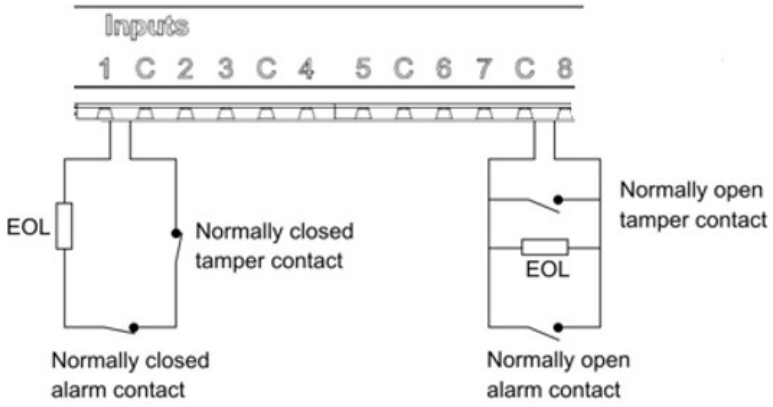
If connecting the Discovery panel to other configurations of zone input circuits, the placement, and values of EOL resistors may differ. In any case, you must test the installation to avoid unexpected results.

Figure 7: Four-state monitored zone input circuits



Alternatively, the Discovery system can be configured to monitor zone inputs for two states (sealed and unsealed). This is accomplished by using one EOL resistor in each circuit, as shown in Figure 8 below.

Figure 8: Two-state monitored zone input circuits

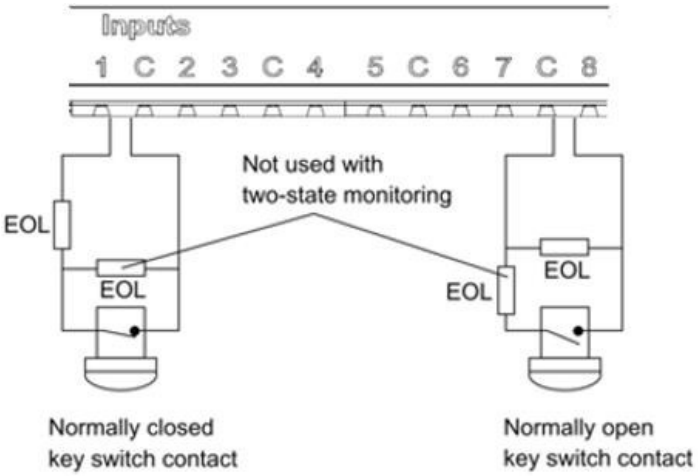


Note: When the system is used in two-state configuration, inputs can only report sealed and unsealed states. This prohibits the use of input types that need to detect short or open states. See the *Basic programming sequence on* page 44 for details.

Special zone input types

Zone inputs programmed as area control type inputs can also be used to turn areas on and off (as opposed to entering a PIN on a keypad). These inputs do not have areas assigned to them: their functions are determined by assigning an alarm group to them.

Figure 9: Wiring of key switches for input types 6 and 31



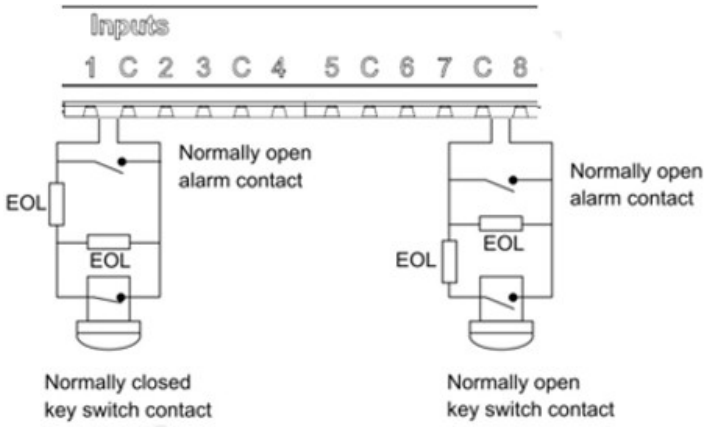
Input type 6 is used for momentary area control.

- The normal state of the key switch is sealed
- When unsealed the programmed alarm group functions are performed

Input type 31 is used for toggling area control. When the input switches to unsealed, the areas secure. When the input seals, the areas are in access.

- The normal state of the key switch is sealed to turn areas off
- When the key switch is unsealed, it turns areas on

Figure 10: Wiring of key switch and alarm contact for input type 33



Input type 33 (24-hour alarm & isolate input) is used to wire a key switch and an alarm contact to the same input. For example, a key switch used to isolate a shop's input in a shopping centre where only one input is available for each shop. Alarm is generated when input changes from sealed to open or short.

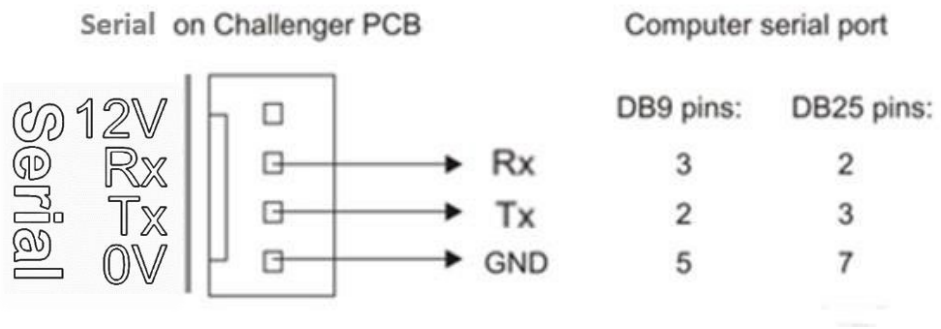
- The normal state of the key switch is sealed
- When unsealed the input is isolated, no alarm generated
- Open circuit generates a tamper alarm
- Short circuit generates an alarm

Serial port

See Figure 12 page 31, item 19. The Serial port may be used for connection to a communicator, management software computer, or to a printer.

Figure 2 below details the required connections from the serial port (previously known as a J15 terminal) to either a DB9 or a DB25 serial connector.

Figure 2: Wiring details for computer connection



TSX10000 TECOM Discovery Control Panel details

Figure 12: Model TSX10000 board details

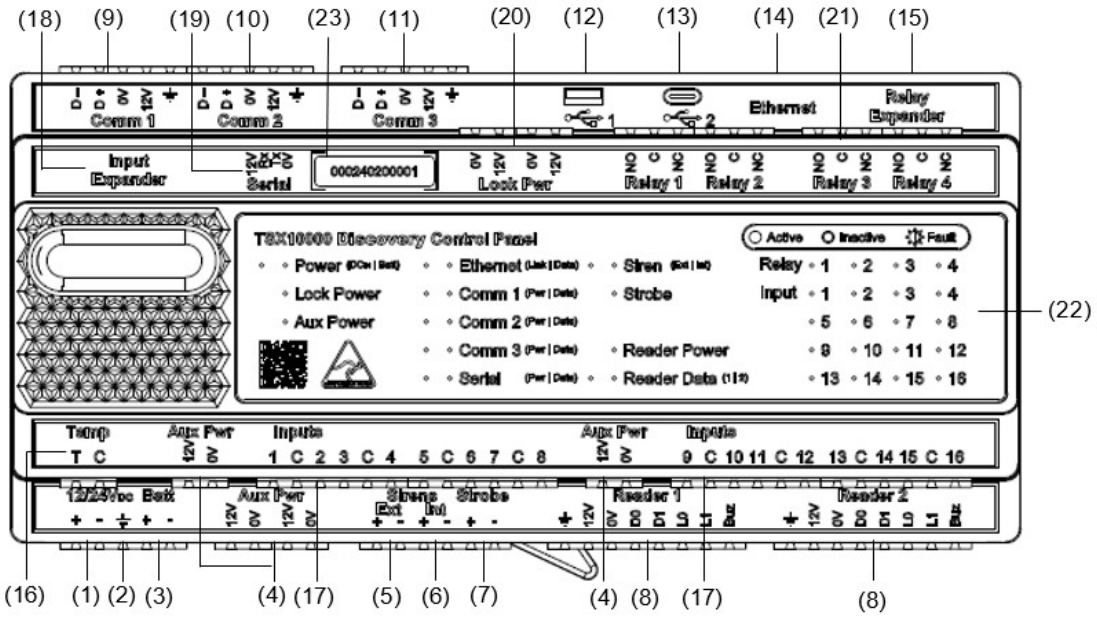


Figure 12: Legend

Item	Description
1.	12/24 VDC power input connection. Connect the DC power input terminals to a TECOM 24 Volt DC or other compliant 12 / 24 Volt DC power supply.
2.	Functional Earth connection. Connect the functional earth terminal to the enclosure safety earth; this is installation dependent.
3.	Battery. Connect the + and – terminals to a compliant 12 V sealed lead acid battery (7.6 Ah recommended not supplied) using the supplied fused battery lead. **Note:** A battery must be connected to use internal or external siren speakers.
4.	4 x Auxiliary power connections. Connect the 12 V and 0 V Aux power output terminals to devices that require 12 Volt DC power, such as detectors. **Note:** Total load across all terminals must not exceed 1000 mA.
5.	External Siren. Connect the Ext+ and Ext– terminals to an external 8 Ω siren speaker or external device that requires 12 Volt DC power. If an external device is not used, connect the Ext+ and Ext– terminals to a 1K ¼ watt resistor (supplied). The External and Internal siren outputs follow relay 16 and are mapped to event flag 1 by default. **Note:** The combined maximum load on the external and internal sirens is 2 x 8 Ω (in parallel) + 1 x 8 Ω when both are set to standard siren modes, or 2 x 8 Ω (in parallel) + 12 Volt DC device when one is set to standard siren mode and the other is set to DC volts mode. The maximum current draw for an external 12 Volt DC device in DC volt mode is 1000 mA.

Item	Description
6.	Internal Siren. Connect the Int+ and Int– terminals to an internal 8 Ω siren speaker or internal device that requires 12 Volt DC power. The internal siren is not monitored and does not require a resistor when not in use. **Note:** The combined maximum load on the external and internal sirens is 2 x 8 Ω (in parallel) + 1 x 8 Ω when both are set to standard siren modes, or 2 x 8 Ω (in parallel) + 12 Volt DC device when one is set to standard siren mode and the other is set to DC volts mode. The maximum current draw for an external 12 Volt DC device in DC volt mode is 1000 mA.
7.	Strobe. Connect the + and – terminals to a 12 Volt strobe. The strobe is not monitored and does not require a resistor when not in use. The strobe output follows relay 15 and is mapped to event flag 2 by default. **Note:** The maximum current draw for the strobe is 1000 mA.
8.	2 x Reader input connections. (*Reserved**)
9.	Comm 1. Connect the D+ and D– terminals to the RS-485 data cable for Comm 1. **Note:** Comm 1 & Comm 2 power output is shared, the maximum current draw across both must not exceed 1000 mA.
10.	Comm 2. Connect the D+ and D– terminals to the RS-485 data cable for Comm 2 (if required). **Note:** Comm 1 & Comm 2 power output is shared, the maximum current draw across both must not exceed 1000 mA.
11.	Comm 3 connection. (*Reserved**)
12.	USB port 1. Type A. (*Reserved**)
13.	USB port 2. Type C. (*Reserved**)
14.	Ethernet port. Connect an RJ-45 ethernet cable to a network device, for connectivity to supported software systems and/or to access to the onboard web browser.
15.	Relay expander connection. Connect the 10-way cable supplied with TS0840 / TS0841 / TS0842 / TS1041 expansion modules to extend the number of outputs on Discovery. **Note:** Relay expander and Serial connections share the same power source and must not exceed 500 mA combined. When connecting an expander that will be powered from an auxiliary power supply (i.e., not powered by the Discovery control panel), the +12 V wire must not be connected to this port.
16.	Tamper. Connect the input and common terminals for the panel tamper switch (supplied). Short circuit for sealed, open circuit for unsealed. Must be sealed if not used. Can only be used with normally closed contacts such as the panel tamper switches. **Note:** When tamper is sealed, only the **DCIN** and **Batt** Power LEDs will operate. For full operation of onboard LEDs, tamper must be unsealed.
17.	16 x Input connections. Connect alarm zone input devices, see “Inputs” on page 26
18.	Input Expander. (*Reserved**)
19.	STU port (previously known as a J15 port). Serial connection/communications port for RS-232 serial communications with external devices. **Note:** Relay expander and Serial connections share the same power source and must not exceed 500 mA combined.
20.	2 x Lock Pwr connections. Connect the 12 V and 0 V lock power output terminals to lock devices that require 12 Volt DC power. **Note:** Total load across all terminals must not exceed 1000 mA.

Item	Description
21.	4 x Relay connections. Unpowered dry-contact relays for external devices. When supplying power to terminals, AC or DC voltage may be used, providing it does not exceed 30 Volts or 3 Amps.
22.	Onboard status LEDs. Indicates the live status of power, inputs and outputs, communications, and various connected devices. As per figure 17 on page 39 **Note:** When tamper is sealed, only the **DCIN** and **Batt** Power LEDs will operate. For full operation of onboard LEDs, tamper must be unsealed.
23.	Serial numbers are in two locations. First location is on the front of the unit in between the Serial and Lock Pwr Labelling. The second location is on the rear of the unit on the label in the centre of the unit.

** Marked items have been reserved for future use.*

Connection details

A Discovery panel may need to be fitted with various add-on modules and interfaces. See each product's installation instructions for details.

Figure 13: Connection details for Items 1-8

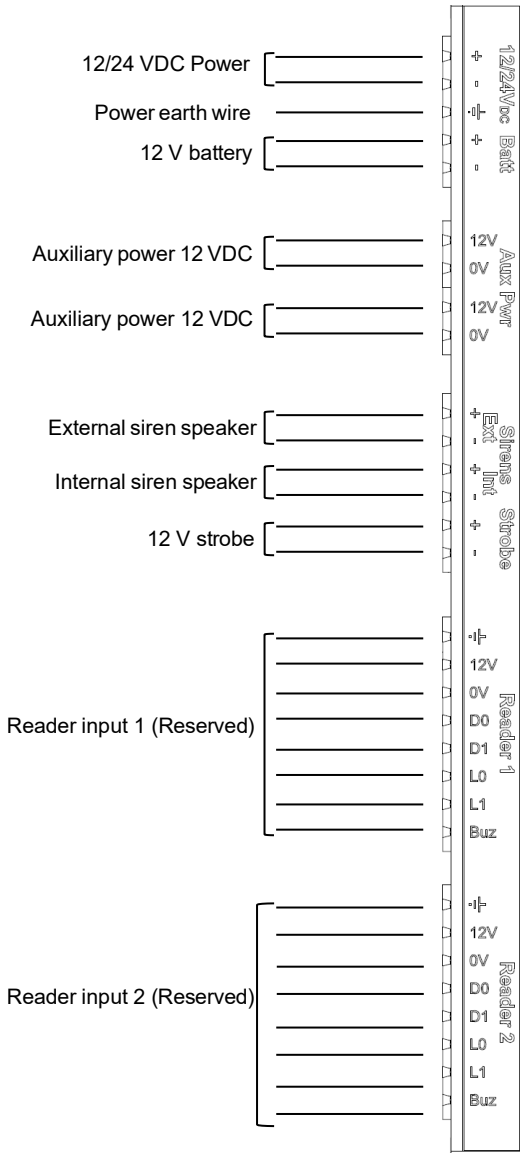


Figure 14: Connection details for Items 9-15

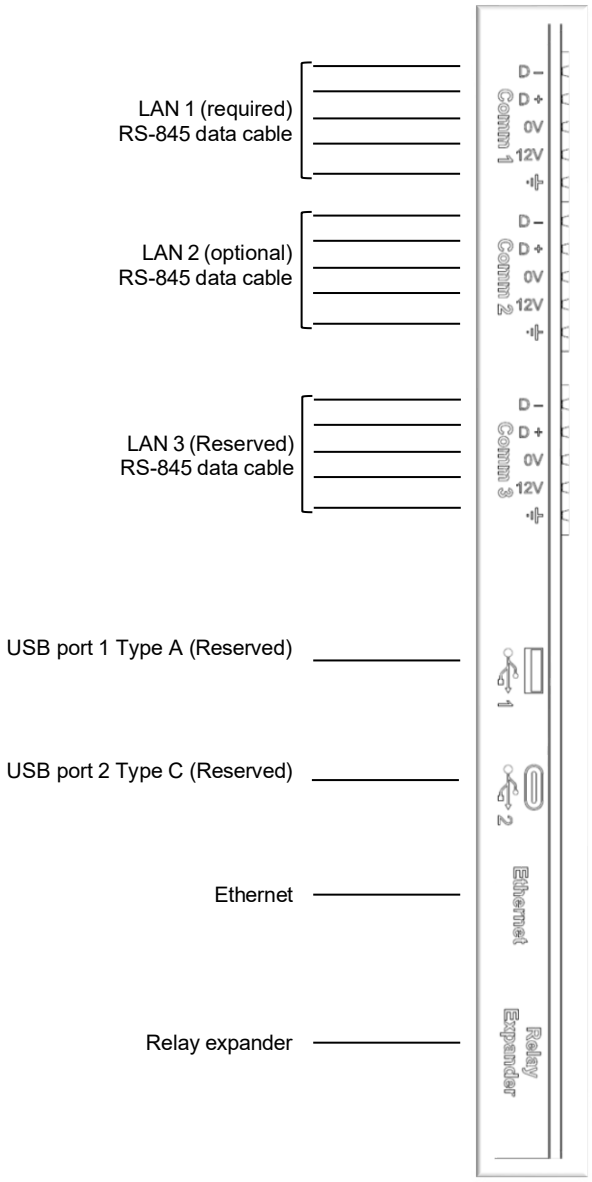


Figure 15: Connection details for items 4, 16 & 17

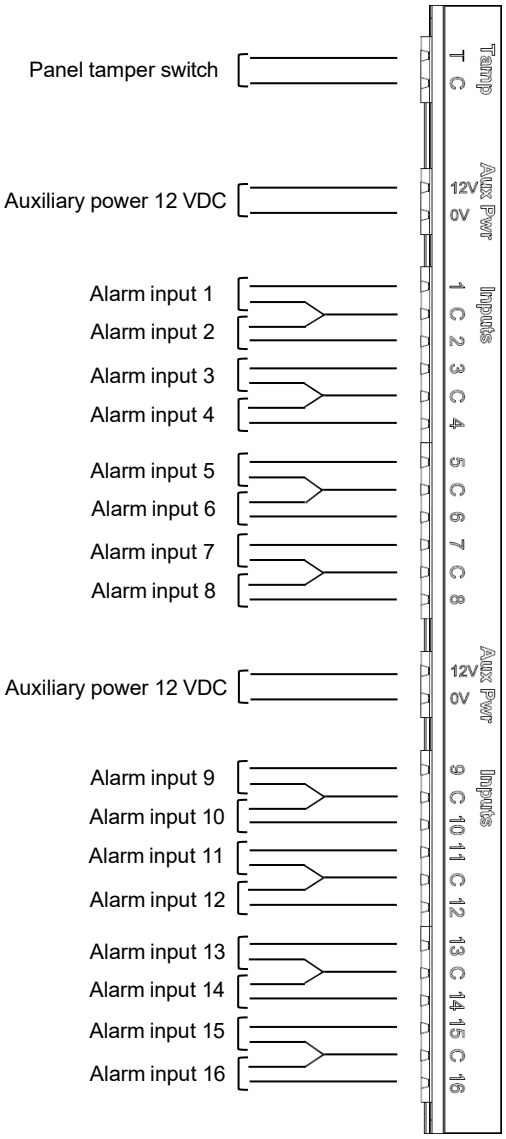


Figure 16: Connection details for items 18-21

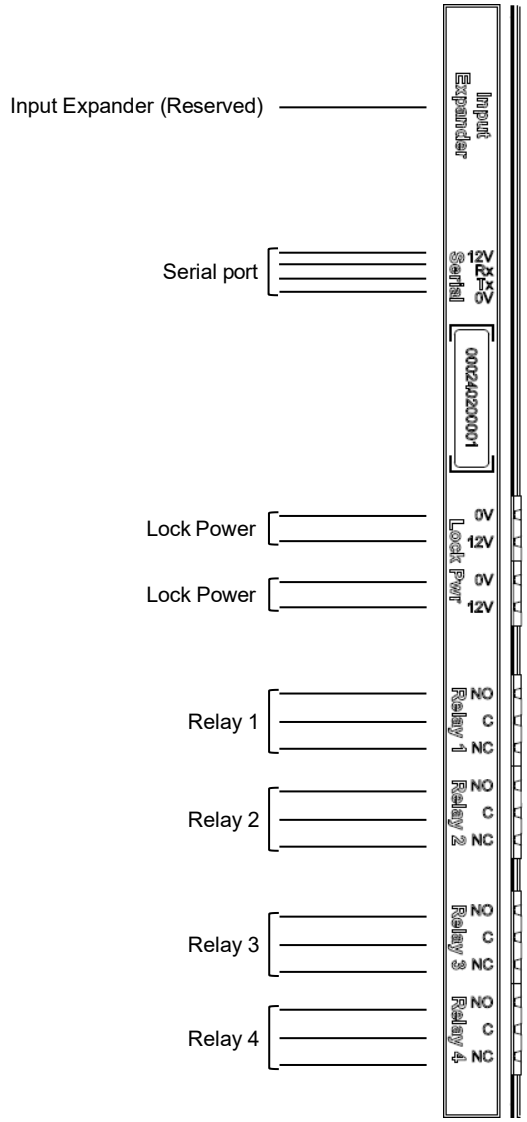
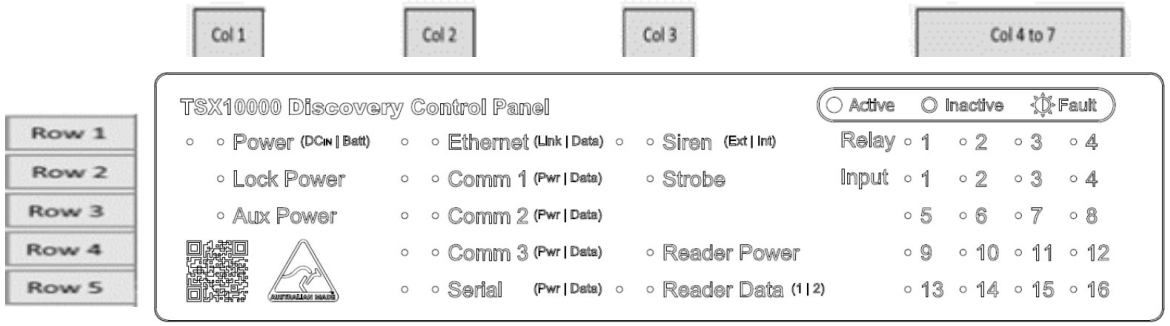


Figure 17: Onboard status LEDs for item 22

LEDs are set out in Rows and Columns as per the diagram and table below:



	Description	Location	Colour	Comment
1	Power (DC IN)	Row 1, Col 1, Left	Dual colour: RED + BLUE	Power OK (12 or 24V) = Blue (solid) Mains Fail / Fault = RED (Fast Flash)
2	Power (Batt)	Row 1, Col 1, Right	Dual colour: RED + BLUE	Battery Fitted = Blue (solid) Battery Missing = Blue (Fast Flash) Battery Fault (Test Fail / Low battery) = RED (Fast Flash)
3	Data LEDs	All Rows, Col 2, Right Row 5, Col 3, Left and Right	Dual colour Blue + Green	Inactive = OFF TX (Transmit) = BLUE (solid) RX (Receive) = GREEN (solid) ***Note:*** *Each colour will flash with activity*
4	Power LEDs Comms 1, Comms 2, Comms 3 And Serial	Col 2, Rows 2 - 5	Dual colour: RED + BLUE	No Fault = Blue (solid) In fault (Fuse fail) = RED (Fast Flash)
5	Power LEDs Ext Siren, Int Siren, Strobe	Col 3 Row 1, 2 and 4	Dual colour: RED + BLUE	No Fault = Blue (solid) In fault (Fuse or Siren fail) = RED (Fast Flash)
6	Reader Data	Col 3, Row 5	Dual colour Blue + Green	Inactive = OFF TX = BLUE (solid) RX = GREEN (solid) ***Note:*** *Each colour should flash with activity*
7	Relays	Col 4 – 7, Row 1	Blue	Relay Active = Blue (solid) Relay Inactive = Off
8	Input 1 - 16	Col 4 – 7, Row 2 - 5	Dual colour Blue + Green	Sealed = Off Alarm State (Unsealed Low or High) = Blue (solid) Fault state (Open / Short) = Red (Fast Flash)

Note: *For full operation of onboard LEDs, tamper must be unsealed.*
When tamper is sealed, only the DC IN and Batt Power LEDs will operate.

Initial programming

This section describes basic initial programming via a RAS. Advanced programming is typically performed via software such as CTPlus, so basic programming also includes the items required to connect with a management software computer. Refer to the documentation provided with the management software for additional details.

This section describes the following programming steps that are part of the installation process:

- “Disarming the system” below
- “Accessing the Discovery menu” below
- “Clearing the memory” on page 44
- “Working with multi-area systems” on page 46
- “Changing the default installer PIN” on page 47
- “Enabling communications” on page 47

An LCD RAS configured as RAS 1 must be connected to LAN 1.

Disarming the system

The system must be completely disarmed before you can access the Install menu on a system keypad (LCD RAS).

To disarm the system:

1. The default message displays on the top line of the RAS. This line may display “There Are No Alarms In This Area,” the time and date, a custom message.

   There Are No Alarms In This Area
   Code:

2. Press 4346 (the default Installer code), press [OFF] [0] (to select all areas), and then press [ENTER].

Tip: When using the system keypad, numbers are entered in sequence. For example, “press 4346” means press the 4 button, the 3 button, the 4 button, and then the 6 button.

Accessing the Discovery menu

The Discovery menu system, as displayed on an LCD RAS, has a first-level User menu and a second level Install menu (the Install menu is option 19 of the User menu). Access to the Install menu is typically limited to installers or administrators.

This manual describes the Discovery programming that you may need for basic system setup. Refer also to:

- *TECOM Discovery User's Manual* for details of Discovery system programming via the Install menu.
- *TECOM Discovery Administrators Manual* for details of Discovery programming and operation via the User menu.

User menu options

As part of the basic system setup, you may need to use the following User menu options:

- Option 7, Service Menu
- Option 12, Test Input
- Option 14, Program Users
- Option 15, Program Time & Date
- Option 20, Door & Floor Groups
- Option 21, Holidays
- Option 25, Change user PIN

To access the User menu:

Use the following steps to access the Discovery User menu when the Code prompt is displayed on the bottom line of the RAS.

1. Press [MENU*].

   To Access Menu Enter Code
   Code:

2. Enter 4346 (default Installer code), and then press [ENTER].

   "0"−Exit "ENTER"−Down "*"−Up
   0−Exit, Menu:

3. You can now select the programming option you need from the User menu. To access the Install menu, enter 19 (Install menu option number), and then press [ENTER].

   Install Menu
   0−Exit, Menu:

You can now select the programming option you need from the Install menu (see Table 4 on page 41).

Install menu options

The Install menu options and the default settings of particular importance to installers are listed in Table 4 on page 41.

Table 4: Install menu options and selected default values

Install menu option	Description
1. Input database	Program all physical inputs on the control panel, DGP, or plug-in expander, and inputs that are activated by macros. The default values for inputs 1 to 16 are: • Input type is set to type 2 Secure Alarm • Report ID type is set to 25-140, General Alarm • Siren event flag is selected • Event flag 2 Secure Alarm is selected, and is mapped to relay 2 Strobe Output
2. Area database	Areas determine how the system is partitioned, and therefore provides the ability to limit users to performing functions only in the areas relevant to their role. The default values for areas are: • Exit time is set to 60 seconds • Entry time is set to 30 seconds • Siren event flag is set to 1
3. RAS database	Program the system's remote arming stations (RASs). RASs provide alarm system control, such as area arming or disarming; and provide access control, such as unlocking a door for a user. You may need to change the RAS's default area LED assignments. RAS 1 is programmed as an LCD RAS, to be polled, and is assigned Alarm Group 2 (Master RAS).
4. DGP database	Program any data gathering panels (DGPs) used to send information to the control panel and to provide added access control functionality.
5. Alarm groups	Program alarm groups to enable users, inputs, and arming stations to control the system's alarm control functionality.
6. Timers	Program the system's timers if the default values are not suitable. The default values for timers are: • Each user category time is set to 0 minutes • Access test time is set to 15 minutes • Secure test time is set to 15 minutes • Warning time is set to 5 minutes • Delay holdup time is set to 60 seconds • Suspicion time is set to 15 seconds • Service time is set to 30 minutes • Local alarm reminder time is set to 0 minutes • Individual test mode time is set to 5 minutes • Door unlock time is set to 5 seconds • Tester event flag time is set to 15 seconds • Siren time is set to 8 minutes • Mains fail time is set to 0 minutes • Card to code time is set to 8 seconds • Minimum area search time is set to 0 minutes • Maximum area search time is set to 0 minutes • Maximum twin trip time is set to 60 seconds

Install menu option	Description
7. System options	Program the system options if the default values are not suitable. The default values for system options are: • Film Low is set to 800 • Film Out is set to 1100 • Input tamper monitoring is selected • Display one input at a time is selected • Username file is selected • EOL resistor is 10 K • Time zone is set to None • Area search time zone is not set • External siren mode is set to a standard 8 Ω siren speaker • Internal siren mode is set to a standard 8 Ω siren speaker
8. Auto reset	Program the Discovery to automatically reset alarms.
9. Communications	Program the communications devices and paths for reporting to a remote monitoring company, connecting to management software computers, and so on.
10. Reserved	This option is not currently used.
11. Version	Display the system's device types and firmware version numbers.
12. Lamp test	Toggle the on/off state of all RAS LEDs in the system so that they may be checked.
13. Time zones	Define time slots (hard time zones) in which certain events can take place.
14. Defaults	Reset the panel to default settings.
15. User category	User categories provide timing for areas that are configured for timed disarming or for delayed arming via vault programming.
16. Map relays	Link relays (outputs) to event flags and/or time zones. The default values for relay mapping are: • Relay 15 (panel strobe output) is mapped to event flag 2. • Relays 16, 32, 48, 64, and so on (panel siren driver) are mapped to event flag 1. The sixteenth relay assigned to each DGP (DGP siren drivers) is mapped to event flag 1.
17. Arm/disarm via TZ	Define arm/disarm timer programs. Areas being armed or disarmed automatically (by time zone) do not require any user action.
18. Vaults	Define areas that, when armed, will automatically arm other areas after a specified time.
19. Area linking	Define a common area that is armed only when the last shared area is armed.
20. Reserved	Not used in this version.
21. Input shunts	Define shunt timers to inhibit inputs from generating alarms during a specified interval.
22. Soft time zones	Define soft time zones. Time zones 26 to 41 can be programmed to be valid when a relay is active and invalid at other times.
23. Poll errors	Display the number of errors detected in communications between the control panel and the devices connected to the control panel.

Install menu option	Description
24. Send programming	Send access control programming for Network Access Controllers (NACs) that may not have been sent automatically.
25. Display last card	Display the site number and ID number of the last card read by a reader connected directly to the Discovery system LAN (not via a Network Access Controller).
26. Diagnostics	Skip this option. It is reserved for factory use.
27. Reserved	Not used in this version.
28. Remote controllers	Use this option to access additional programming menus for remote devices such as a RAS, a DGP, or a TS0862 Smart Door Controller (which is addressed and polled as a RAS).
29. Panel voltage & current	Display the values of the panel's voltage and current consumption.
30. Reserved	Not used in this version.
31. Battery testing	Program automatic battery testing or perform manual battery testing.
32. Custom message	Create a custom message (or use the panel's time and date) for the top line of the RAS's initial LCD screen.
33. Program next service	Program the date of the next service call, and a custom message on the LCD to call the installer.
34. Program summary event flags	Program event flags to be triggered on system-wide events such as mains failures or DGPs going offline.
35. Program macro logic	Program macro logic equations for activating inputs or event flags based on the conditions of one to four macro inputs (event flags or relays).
36. Area groups	Area groups include one or more areas that can be more easily managed, for example armed or disarmed simultaneously. Each area in an area group must be configured to allow certain users (as specified by the user's alarm group) to have permissions for arming, disarming, alarm reset, and for timing. Area group 1 contains areas 1 to 99 by default.
37. Reserved	Not used in this version.
38. Reset input test days	After programming timed input testing the installer may need to reset the input timer before handing the system over to the customer.
39. Automation	Program automation zones such as C-Bus devices to be controlled via the Discovery panel.
40. Door/lift names and E/F trigger	Program a door's name, event flag and event flag trigger duration (typically for use as an automation zone trigger).
41. Event flag names	Assign names to the Discovery panel's event flags.
42. Discovery name	Assign a name to the Discovery panel.
43. Automation status	Check and control automation zones from any LCD RAS.
44. Standard lifts	Program up to 2 lifts. Each lift up to 10 floors.
45. Standard doors	Program up to 32 doors.

Clearing the memory

When installing a new panel, or upgrading the firmware on an existing panel, we recommend that you default the panel before programming it.

Note: All custom programming will be erased. Back up any data you need before using these procedures.

The panel can be defaulted in two ways, see:

- “Clearing the memory via RAS” below, or
- “Clearing the memory via the Discovery panel Reset button” below

Clearing the memory via RAS

Users with access to Installer menu option 14 Defaults can clear the memory via RAS.

To clear the panel’s memory via RAS:

1. From the Install menu option 14 Defaults, press 99 [ENTER] to reset all custom programming.

Clearing the memory via the Discovery panel reset button

You may want to perform a “panel default” to reset the panel to its factory default state and erase all programming.

To clear the panel’s memory without Install menu access:

1. Unseal the tamper switch (Figure 12 on page 31, item 16).
2. Press and hold the reset button on the back of the module. Holding the reset button for 10-20 seconds will make all the LEDs on the front of the panel blink, release the reset button during this period to do a full factory default on the panel.

   Note: Releasing the button just before the blinking starts or after the blinking stops will cause nothing to change in the panel. If another user in the system has a PIN of 4346 or 4347, the installer PIN will also not be reset.

Basic programming sequence

This section provides an overview of how to use an LCD RAS to set up a basic alarm system that uses PINs for access control.

To initially program a Discovery system:

1. Plan the system and fill out the programming sheets.
2. Disarm the system. See “Disarming the system” on page 39.
3. Access the Install menu. See “Accessing the Discovery menu”
4. Default the system. See “Clearing the memory” above.

5. Disarm the system and access the Install menu again, as described above.
6. Program the date and time via User menu option 15 Time and Date.
7. Change the default installer PIN. See “Changing the default installer PIN” on page 47.
8. If the system will contain fewer than 99 areas, then modify Area Group 1 using Install menu option 36. Area Groups. See “Working with multi-area systems” on page 46 for details.
9. Program the required system options via Install menu option 7 System Options if the default values are not suitable (see Table 4 on page 41).
10. If a 12 Volt DC device is connected to the external siren terminals (Figure 12 on page 31 item 5), set the *External siren mode* system option to “DC Volts”. If a 12 Volt DC device is connected to the internal siren terminals (Figure 12 on page 31 item 6), set the *Internal siren mode* system option to “DC Volts”.
11. Program holidays in User menu option 21 Holidays.
12. Holidays must also be assigned one or more holiday types (1 to 8). Decide what each holiday type will be used for and record the purpose in the Holidays and Holiday Types worksheets (see the *Discovery Administrators Manual*).
13. Program time zones via Install menu option 13 Time Zones.
14. Program areas via Install menu option 2 Area Database.
15. Program area groups via Install menu option 36 Area Groups to help manage areas. See also “Working with multi-area systems” on page 46.
16. Program alarm groups via Install menu option 5 Alarm Groups.
17. If your system requires more than 16 inputs, or requires advanced access control functionality, then you will need to program DGPs (data gathering panels) into the system. Program DGPs via Install menu option 4 DGP Database.
18. Program inputs via Install menu option 1 Input Database.
19. If your system requires more than 1 arming station, then you will need to program RASs via Install menu option 3 RAS Database.
20. Program the system’s timers via Install menu option 6 Timers if the default values are not suitable (see Table 4 on page 41).
21. Program the communication options to enable the Discovery system to report alarms to the remote monitoring station, via Install menu option 9 Communications.
22. Program the behaviour of relays via Install menu option 16 Map Relays.
23. Program (at least) the first user. See “Programming users” on page 60.

Working with multi-area systems

New or defaulted Discovery panels can arm and disarm areas 1 to 99. This functionality is accomplished via Area Group 1, which contains all areas. Area Group 1 is used in the following Alarm Groups:

- Alarm Group 2–Master RAS or Door
- Alarm Group 3–Master Code (Installer)
- Alarm Group 11–High Level User Master
- Alarm Group 12–Low Level User Master
- Alarm Group 13–All Area User Code

The default installer user 50 (PIN 4346) is assigned Alarm Group 3, which controls the areas contained in Area Group 1. Alarm Group 3 cannot be edited, but Area Group 1 can have areas removed.

Note: If the Discovery panel does not need all areas, we recommend removing unneeded areas from Area Group 1.

Default installer PIN

Changing the default installer PIN

The default panel programming includes PIN 4346 for user 50. The default PIN must be changed to keep unauthorised persons from modifying your programming or using the system without authorisation.

To change the default installer PIN:

1. From the User menu prompt, press [2] [5] [ENTER] to change PIN for the master user.
2. Enter the old code.
3. Enter the new code.
4. Re-Enter the new code.
5. Press Enter

Note: Unlike previous versions of Challenger panels, you can't actually delete user 50 from the panel (however, user 50 can be deleted from management software). When you 'delete' user 50 from the panel, the user record is voided and not deleted. Doing so can create a user tally that differs between the panel and management software.

Restoring the default installer PIN

If the installer PIN for user 50 has been changed and lost, you may need to reset the PIN to default (4346). This is easily accomplished via management software. However, if necessary, it can be done from the Discovery panel reset button.

Note: This also defaults area group 1 back to areas 1 to 99, and defaults RAS 1 on LAN 1.

To restore the default installer PIN:

1. Unseal the tamper switch (Figure 12 on page 31, item 16).
2. Press and hold the reset button on the back of the module. Holding the reset button momentarily (0.5 – 2 seconds) will perform a default on the installer PIN and user.

   Note: If another user in the system has a PIN of 4346 or 4347, the installer PIN will not be reset.

Enabling communications

Although basic programming and administration of the Discovery system can be done via an LCD RAS on the RS-485 LAN, most systems use software such as CTPlus after installation. The Discovery panel also provides a web interface to manage configuration of communications, and the panel may be configured to communicate with a management software computer by an alternative path to provide backup reporting of alarms.

This section describes the RAS programming required to prepare for communications between the Discovery panel and a CTPlus management software computer. Refer to the documentation provided with the management software for additional details, if required.

A new or defaulted Discovery panel is configured by default to communicate via DHCP to a management software computer.

WARNING: Configuring IP communications requires consultation with the client's Network Administrator. Failure to gain the essential information from the client may result in the Discovery panel not communicating with the IP Receiver, management software, or introducing data collisions with parts of the client's existing IP network and possibly a total network shutdown.

Discovery programming

Discovery panels have a range of communications options, configured via Install menu 9 Communications.

The first two options in the Communications menu are:

- 1. Setup H/W. This option is used to configure the communications ports on the panel (onboard).
- 2. Setup Paths. This option is used to configure up to 10 communication paths for connecting to various devices such as a management software computer or UltraSync.

Ten communication paths are available for simultaneous management software connections, reporting via IP, printing events, and so on. The status of each path can be quickly displayed via RAS to facilitate installation and troubleshooting.

A communication path can be assigned a priority number in the range 1 to 10 (the highest priority being 1), or 0 for no priority assignment. Also, a communication path can be designated as a backup for another communication path.

A Discovery panel has default values programmed for the following communications paths:

- Path 3. Management Software—for IP connection to a computer running management software such as CTPlus and Discovery web interface.
- Path 8 Mobile Device—for use with the TecomPlus Mobile App, enabling you to view history, alarms, users and control devices such as doors and areas over a TCP/IP connection. Please note that Discovery support in the app is currently limited and will be expanded over time.

Each of the 10 communications paths can be edited. The default paths are provided as a shortcut to setting up the panel.

Note: If you need to change the format of a path that has been previously programmed (or one of the default paths), first set the format to "0–None" to clear the previous format's programming.

The following default values are typically sufficient to establish communications with the management software computer:

- Security password 0000000000
- Security attempts 255

Note: It is advisable to change the settings for the password and security attempts once the management software is communicating with the Discovery panel.

Example 1: Programming an event-driven IP connection to CTPlus

To establish an event-driven IP connection:

1. On an LCD RAS, access the Install menu. See “Accessing the Discovery menu” on page 39.
2. Press 9 [ENTER] to access the Communications menu, and then select option 1–Setup H/W, to access the Setup menu.
3. Select option 1–Onboard and then press [ENTER] to step through the options. Change the default settings, if required (in particular, ensure Ethernet is set to Yes).

   Note: By default, DHCP is enabled.

   To view the IP address, connect an Ethernet cable to Discovery from a connected IP network source, and use the RAS panel as below:

   Once entered through the password, Press 19 [ENTER], 9 [ENTER], 3 [ENTER], 2 [ENTER], 1 [ENTER], Press [ENTER] again and the IP address will appear on the RAS LCD screen.

   If you want to configure the Ethernet settings manually, disable DHCP and use the values advised by the site’s network administrator for the IP address, subnet mask and gateway address. For more detailed info, please refer to Setup communications hardware on Discovery Panel on page 52.
4. When returned to the Setup menu, press [0] [ENTER] to exit to the Communications menu.

   Instructions on path setup using the Discovery web interface is on page 58, alternatively you can use RAS instructions from point 5.
5. At the Communications menu, select option 2–Setup Paths, and then press [3] [ENTER] to select path 3–MANAGEMENT SOFT.
6. Press [ENTER] to display the first item for path 3, and then select option 1–Main.
7. Press [ENTER] to step through the options and change the default settings if required (in particular, change Enabled to Yes). You might also need to change the account code and the computer password (default is 0000000000).
8. When returned to the Path menu select option 6–Path IP Address.

9. Press [ENTER] to step through the options, and program the following settings (in particular, program the CTPlus computer's IP address).

   Use the default values (if applicable) for the Send and Listen IP Port numbers (default is 3001) and UDP/IP.

10. Press 0 [ENTER] as needed to exit from the Communications menu.
11. Connect the Discovery panel's Ethernet port to the LAN or directly to the CTPlus computer via an Ethernet cable.
12. In CTPlus, select *Panel programming* > *Panels* from the **Navigation** bar to open the Panels form.
13. Click the **New** button on the form's toolbar to create a new panel record. Enter a description for the new panel record.
14. On the *Definition* tab, tick the **Enable** checkbox and select the Panel type: 'TSX10000 – Discovery Control Panel'.
15. On the *Communication* tab, select UDP/IP from the drop-down list for the **Type** field. Enter the Discovery panel's IP address and IP port number (for example 3001) in the **IP address** and **Port** fields, respectively.
16. Save the panel record by clicking the **Save** button in the form's toolbar.
17. Click the **Connections** button on the ribbon to view the list of panel connections. The new entry for the panel in the connections list should indicate that the panel is enabled and online.

Example 2: Programming an UltraSync connection

The steps required to connect management software to a Discovery panel via UltraSync are:

- Get the Discovery panel's SID (UltraSync serial number)
- Set up communications hardware on Discovery panel
- Optionally, you may set up a user on the Discovery panel (*for this guide, we will simply use the existing default TECOM MASTER user 50*)
- Configure UltraSync on Discovery panel
- Connect to Discovery panel from CTPlus

Get Discovery Panel's serial number

The Discovery SID can be obtained a number of ways:

1. Through the Discovery web interface.
2. You may also use a keypad to view the UltraSync SID by going into Menu 19 (Install menu) > 11 (Version) > 1 (Discovery) and pressing Enter to cycle through until you see "Serial No:".
3. CTPlus can also show the Discovery panel's SID if it is connected with a communication type other than UltraSync (e.g., Ethernet). This can be achieved through Diagnostics, but is also easily available in the Panels form by clicking on the Panels button (on the Panel programming ribbon tab), selecting the required Discovery panel, and then clicking on the Communication tab. The Serial number field will be pre-populated with the UltraSync SID when CTPlus is online to the panel using any connection method.

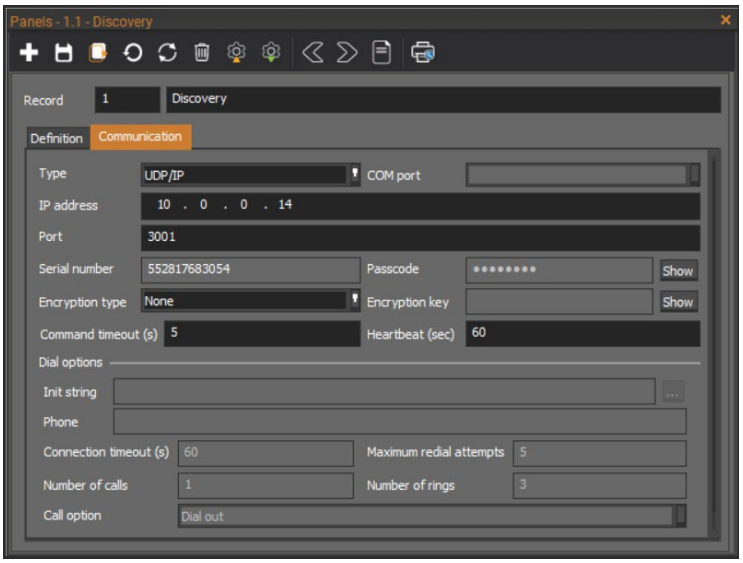


Figure 18: Panel 1.1 Ch 1

Setup communications hardware on Discovery Panel

Ethernet

To use UltraSync via Ethernet, the Discovery panel communications hardware must be configured and physically connected to the network via Ethernet cable. The network must also be connected to the Internet for UltraSync connectivity to be successful.

Discovery supports using DHCP to automatically assign IP address information or may be configured manually. Communications hardware may be configured either via keypad, using CTPlus software, or the Discovery Web interface.

Keypad:

To configure comm hardware using the keypad, go into Menu 19 (Install menu) > 9 (Communications) > 1 (Setup H/W) > 1 (Onboard), and press [ENTER] several times until you reach the section on Ethernet:

- Ensure that the Ethernet interface is enabled (press * [MENU] to toggle between YES or NO):

  YES-Ethernet
  ***-Change 0-Skip**

- Configure whether DHCP is to be used or not (press * [MENU] to toggle between YES or NO):

  YES-Enable DHCP
  ***-Change 0-Skip**

- Configure whether the panel will respond to Ping commands (press * [MENU] to toggle between YES or NO):

  YES-Enable ping
  ***-Change 0-Skip**

If DHCP is not enabled, additional options for IP address information will need to be set-up using the steps below:

- Configure the Ethernet interface's IP address by entering each segment, followed by the [ENTER] key:

  IP Add:
  192.168.000.117
  IP(1):

- Configure the Ethernet interface's Subnet mask by entering each segment, followed by the [ENTER] key:

  Subnet mask:
  255.255.255.000
  IP(1):

- Configure the Ethernet interface's Gateway address by entering each segment, followed by the [ENTER] key:

```
Gateway add:
198.168.000.000
IP(1):
```

- Configure the Ethernet interface's DNS 1 address by entering each segment, followed by the [ENTER] key:

```
DNS 1 add:
198.168.056.001
IP(1):
```

- Configure the Ethernet interface's DNS 2 address by entering each segment, followed by the [ENTER] key:

```
DNS 2 add:
198.168.056.002
IP(1):
```

If DHCP is enabled, the IP address may be viewed by following the steps below:

- Using Install Menu option 9 Communications, press [3] and then press [ENTER] to view the Status menu.

```
1−Path Status 2−HW Status 3−MM Software
0−Exit, Menu:
```

- Press [2] [ENTER] for "Hardware Status".
- Press [1] [ENTER] for the onboard Ethernet interface.
- Ensure that the Ethernet interface shows "Link OK."

```
Eth: Link Ok (100 Mbps)
Press Enter
```

- Press [ENTER] to display the Ethernet interface's IP address programmed.

```
Eth: IP Addr 192.168.000.117 (dhcp)
Press Enter
```

- Press [ENTER] to display the Subnet Mask address:

```
Subnet Mask: 255.255.255.000 (dhcp)
IP(1): Press Enter
```

- Press [ENTER] to display the Gateway address:

```
Gateway Add: 198.168.0.00 (dhcp)
IP(1): Press Enter
```

- Press [ENTER] to display the DNS address 1:

```
DNS 1 Add: 198.168.056.001 (dhcp)
IP(1):
```

- Press [ENTER] to display the DNS address 2:

DNS 2 Add: 198.168.056.002 (dhcp)
IP(1):

- Press [ENTER] to display the Ethernet interface's MAC address:

Eth: MAC Addr 00:17:55:EE:78:d9
Press Enter

CTPlus Program:

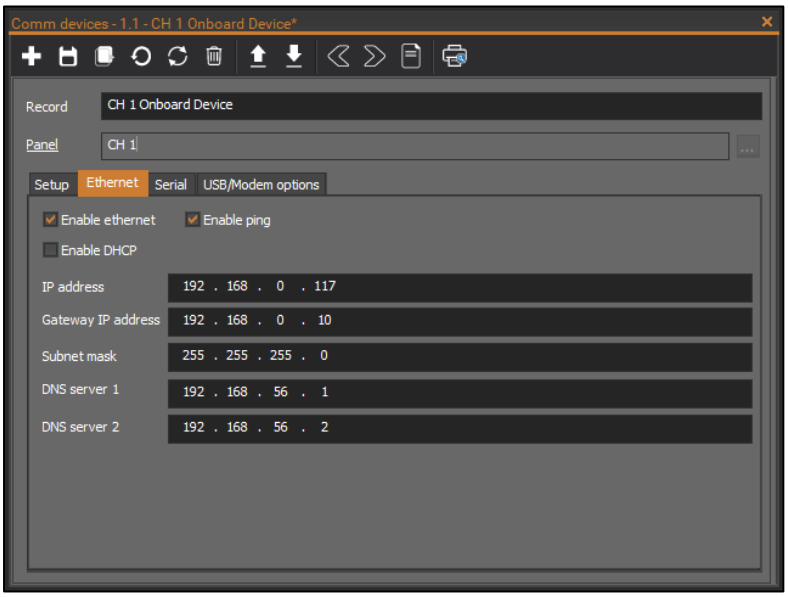


Figure 19: Comm devices

To configure comm hardware in the CTPlus software, go to Panel programming > Communications > Comm devices. On the Comms devices form, configure Ethernet on the Onboard communications device using the Ethernet tab, tick the "Enable Ethernet," "Enable ping" and if required, the "Enable DHCP" checkbox as well.

If DHCP is not available, the IP address parameters may be configured manually by ensuring that "Enable DHCP" is un-ticked and filling in the required information.

If using DHCP, you can see what IP address, Gateway address, Subnet mask and DNS addresses are automatically assigned by viewing Diagnostics

information. To do this, ensure that your Discovery panel is online to CTPlus and follow the steps below:

- Go to the Status and Control form (this can be found under the Operations tab if it is currently hidden)
- Right Click on the Discovery Panel
- Go to Diagnostics-> Diagnostics
- Select “Comms device” for Diagnostics type

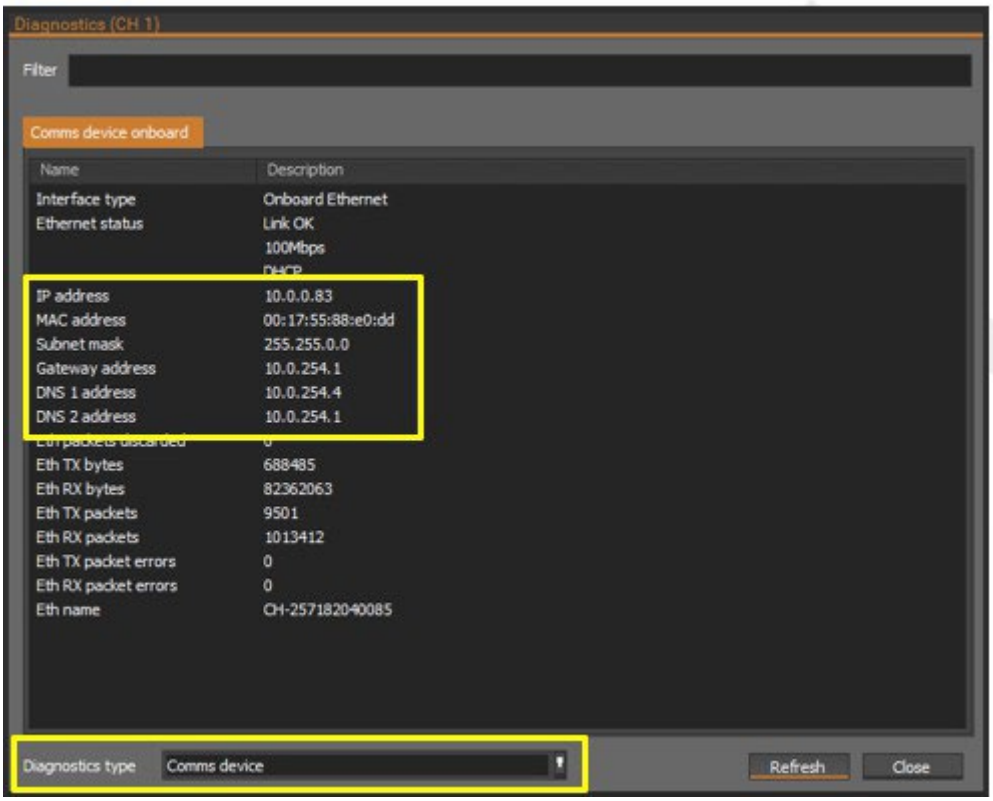


Figure 20: Diagnostics

Configure UltraSync on Discovery panel via CTPlus

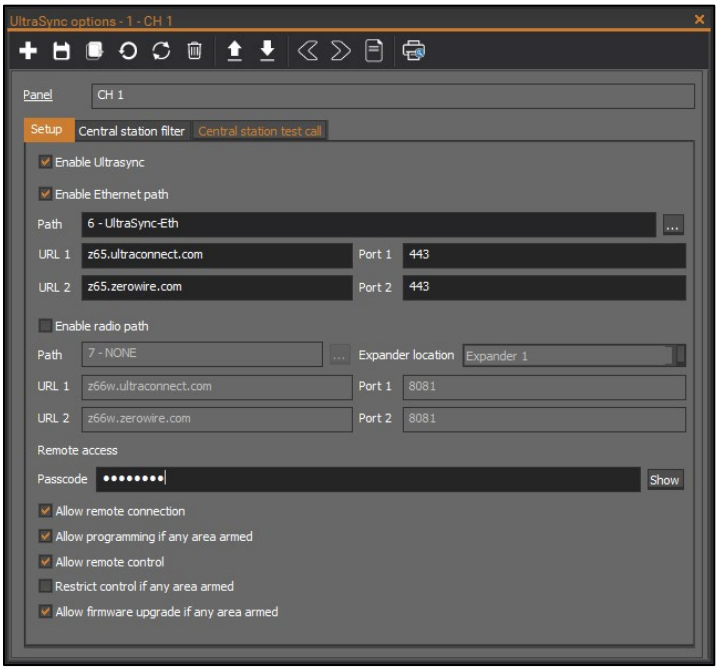


Figure 21: UltraSync Configuration

To configure UltraSync on Discovery panel:

- Go to CTPlus -> Panel programming -> Communications -> UltraSync options.
- On the Setup tab, tick the “Enable UltraSync” and the “Enable Ethernet path” checkboxes.
- Path: Configured Ethernet path is assigned by default. If you would like to change the path used, choose any unconfigured communication path by clicking the Browse button, or by typing the path number directly into the field.
- URL and Port info have default values and should only be changed if advised by tech support.
- In addition to the Ethernet path, you can enable the radio path and use it as a backup to the Ethernet path. This will take up to two paths.
- Enter the 8-digit UltraSync passcode. This must be any numerical value other than ‘00000000’.

Connect to Discovery panel from CTPlus

To connect to a Discovery panel using CTPlus via UltraSync:

- Click the Panels button on the Panel programming ribbon tab.
- Click the New button on the form's toolbar (if creating a new panel).
- On the Communication tab:
    - Select UltraSync from the Type drop-down list.
    - Enter the Discovery panel's SID in the Serial number field.
    - Enter the Discovery panel's passcode in the Passcode field (as configured in UltraSync options)
- On the Definition tab:
    - Tick the "Enable" checkbox.
    - Select "Authentication" from the "Authentication Type" drop-down list.
    - Enter the User number in the Username field.
    - Enter the User PIN in the User password field.
    - Time zone: If panel is non-provisioned (default), set TZ to your preferred location. If the panel is provisioned (monitored), TZ is not required.
    - Click the Save button on the form's toolbar.

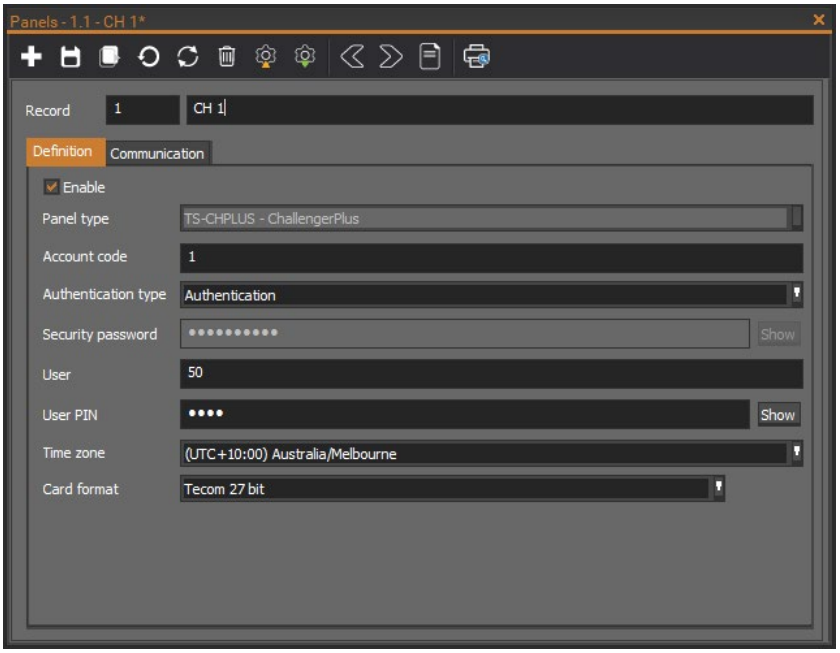


Figure 22: UltraSync Authentication

Discovery web interface:

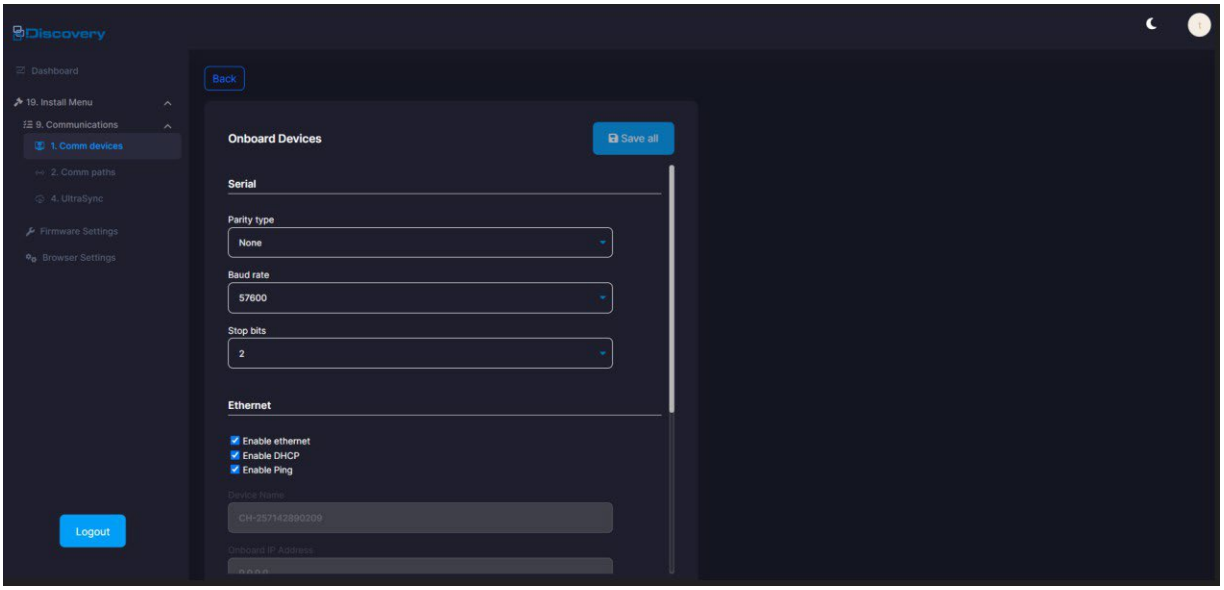


Figure 23: Comm devices

To configure comm hardware in the Discovery web interface, go to 9. Communications > 1. Comms devices > Select comms device. Click on the Onboard devices to then see the Serial and Ethernet onboard devices. To configure Ethernet on the Onboard devices, tick the “Enable Ethernet,” “Enable ping” and if required, the “Enable DHCP” checkbox as well.

If DHCP is not available, the IP address parameters may be configured manually by ensuring that “Enable DHCP” is un-ticked and filling in the required information.

Configure UltraSync on Discovery panel via Discovery web interface

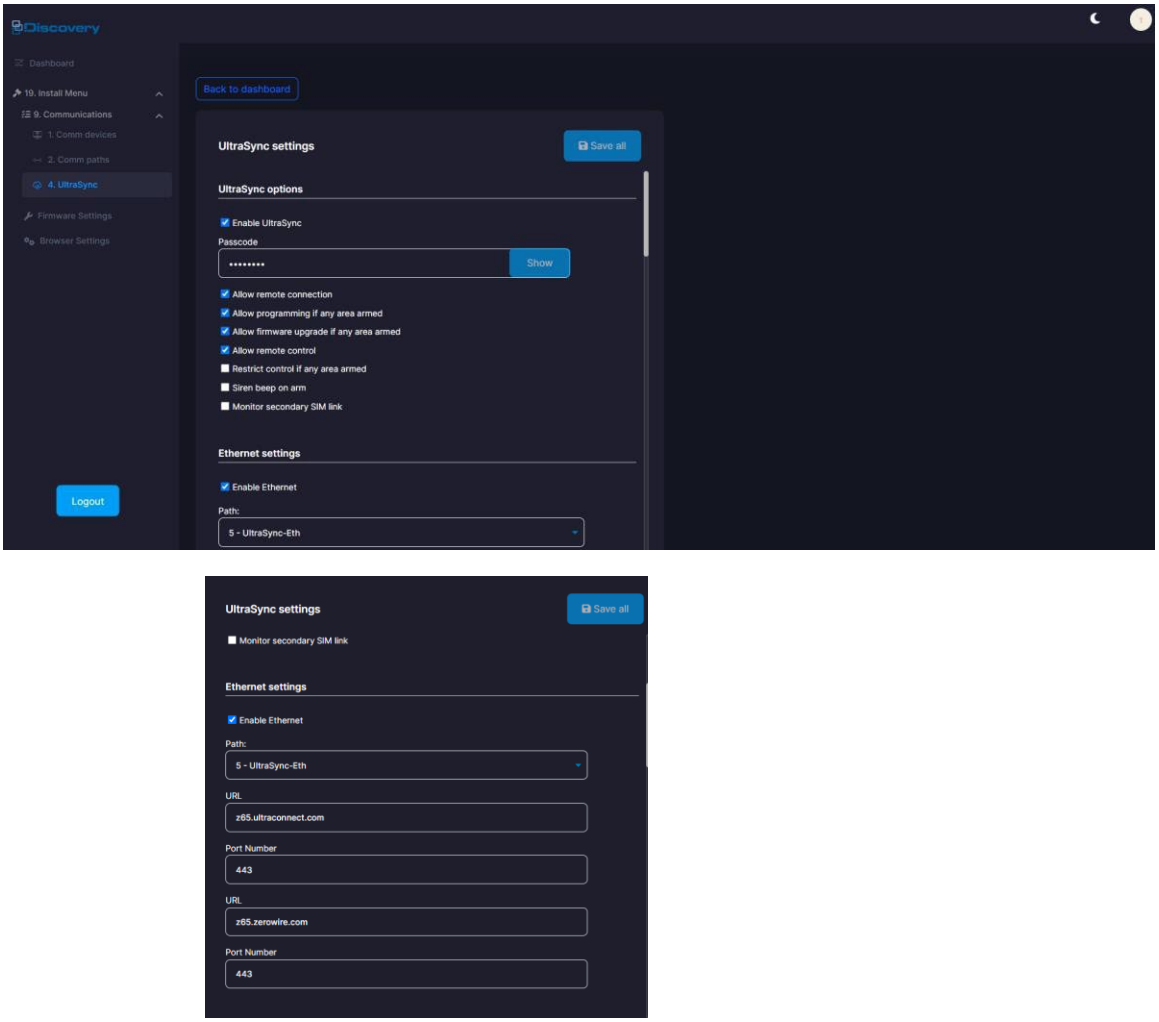


Figure 24: UltraSync Configuration

To configure UltraSync on Discovery panel:

- Go to Discovery web interface -> 9. Communications -> 4. UltraSync
- On the UltraSync options tab, tick the “Enable UltraSync” and the “Enable Ethernet path” checkboxes.
- Path: Configured Ethernet path is assigned by default. If you would like to change the path used, choose any unconfigured communication path

clicking the Browse button, or by typing the path number directly into the field.

- URL and Port info have default values and should only be changed if advised by tech support.
- In addition to the Ethernet path, you can enable the radio path and use it as a backup to the Ethernet path. This will take up to two paths.
- Enter the 8-digit UltraSync passcode. This must be any numerical value other than '00000000'.
- To grant full access to CTPlus via UltraSync, parameters below are enabled by default.
    - **Allow remote connection**: Enables remote access between the CTPlus software and the Discovery panel via UltraSync.
    - **Allow programming if any area is armed**: If enabled, user can modify the Discovery database (when connected via UltraSync) when any areas are armed. Turn off to only allow programming when all areas are disarmed.
    - **Allow remote control**: If enabled, users can send commands (e.g., open door, lock door etc.) to the Discovery when connected via UltraSync.
    - **Allow firmware upgrade if any area is armed**: If enabled, users can upgrade the Discovery firmware via UltraSync connection when any areas are armed. Turn off to only allow firmware upgrades when all areas are disarmed.

Programming users

Unless you will be programming (adding) the system's users yourself, you will need to program at least one administrator who will be able to program additional users. See *Discovery Administrators Manual* for details.

The default values for User 50, the master code, are:

- Name TECOM Master
- PIN 4346
- Alarm Group 3 (contains all areas, as defined by Area Group 1)
- Door Group 1
- Floor Group 1

Appendix A: AS/NZ Standards and EMC Immunity Requirements

Table 5: Compliance and standards

Compliance Title / Notes	Applicable Standards
All wiring within the enclosure must comply with **at least one** of the listed standards	IEC 60332-1-2, IEC 60332-1-3, IEC 60332-2-2, IEC TS 60695-11-21, UL 2556 VW-1, AS/NZS 3008-1, AS/NZS 5000-1, AS/NZS 5000-3.
Installed battery must be compliant with **at least one** of the listed standards	IEC 60086-4, IEC 60086-5, IEC 60896-11, IEC 60896-21, IEC 60896-22, IEC 61056-1, IEC 61056-2, IEC 61427, IEC/TS 61430, IEC 61434, IEC 61959, IEC 62133, IEC 62281, IEC 62485-2
AS/NZ Standards	
Audio/video, information and communication technology equipment – Part 1: Safety requirements	AS/NZS 62368.1
Electromagnetic compatibility – Part 6.3: Generic Standards-Emission standard for residential, commercial and light-industrial environments	AS/NZS 61000.6.3
EMC Immunity requirements	
Electromagnetic compatibility of multimedia equipment – Immunity requirements	EN 55035
Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test	EN 61000-4-2
Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radiofrequency, electromagnetic field immunity test	EN 61000-4-3
Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test	EN 61000-4-4
Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test	EN 61000-4-5
Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6
Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11
DC Power Port Disturbance Voltage	EN 6100-6-3
Electromagnetic compatibility of multimedia equipment – Emission requirements	EN 55032

Appendix B: Environmental and Mechanical Specifications

Environmental specifications

Table 6: TSX10000, Discovery Control Panel

Operating & storage location:	Indoors, dry area
Ambient temperature range:	0–+40 ˚C (near enclosure surface) 0– +50 ˚C (near module surface)
Storage temperature range:	-20–+ 80 ˚C
Operating humidity range:	93% non-condensing
Maximum altitude during operation:	Up to and including 2000 meters above sea level
Pollution degree[3]:	2
IP protection:	IP30 (in enclosure) IP20

Mechanical specifications

Table 7: TSX10000, Discovery Control Panel

Dimensions:	W 215 × H 100 × D 63 mm (no connectors fitted)
Weight:	700 g
Mounting:	Mount on TS35 DIN rail only, via the in-built channel and clip. Rail per IEC 60715 and at least: 7.5 mm high 215 mm long. Do not drill the Discovery module. Do not clamp any surface of the Discovery module. Do not use tape or adhesive to mount the Discovery module. Do not apply tape or adhesives on or near any opening of the Discovery module.
Operating orientation:	Wall mounted (vertical): Long axis of the Discovery must be horizontal. The front decal text to be upright as sighted when standing in front of the mounted unit. Shelf / tray mounted (flat): The front label to be pointing towards the sky.

When using an unapproved enclosure not specified by TECOM, the following requirements must be met:

Table 8: Minimum Enclosure Requirements

Compliance	Must comply with local codes applicable to electrical, security and access control installations considering: a) Its constituent materials and construction. b) The complement of equipment fitted inside the enclosure: each item's specific mounting, wiring and environmental requirements. c) The power provisioned to the devices mounted inside the enclosure and their dissipation. d) The wiring requirements of the devices within the enclosure, partitioning of circuits entering and inside the enclosure and the protection, support and restraint of wiring entering and within the enclosure. Installer responsibility to certify custom installation.
Material	Metal or plastic. Metal enclosure required when housing commonly available off-line power supplies; refer to module datasheet / CB report.
Earthing	Metal enclosures housing products powered by sources rated above ES1 must have a safety earth connection; each separable metal part must be wire connected to earth. The safety earth wiring must comply with all local codes. The Discovery module and peripherals require a functional earth connection. Minimum wire size 0.5mm^2 (AWG 20). Power supplies typically require a compliant safety earth connection; refer to the specific power supply datasheet and CB report.
Air flow	The enclosure must not be sealed. Specific ventilation openings are not mandatory; it shall be possible for air to flow to the interior, via the door gaps, rear cable entry opening, conduit openings, etc.
Dimensions	Minimum enclosure dimensions: Depth = 70mm. Interior volume = 10,500 cm^3 (10.5 l); For solid bottom, open-top drawer mounts with < 50 mm clearance above, calculate using the minimum side height. Minimum clearance between Discovery module to enclosure walls or other encumbrances: Width = 20 mm per side (300 mm minimum enclosure width) Height = 35 mm minimum above and below the connector faces Rear face slots = 0 mm Front face = 5 mm
Movable installations (eg: in sliding rack drawers).	Wiring to be secured close to the termination points to isolate the screwed connections from wire motion. Wiring to be routed and secured so that it is clear of rails and pinch points. Adequate slack to be provided to allow for free movement. Free harness bundle to be managed at point of installation so that it is always free of other encumbrances. Hinged cable management arms or cable track ducting are recommended.

Appendix C: Electrical Specifications

Table 9: TSX10000, Discovery module, power input / output

Description	24 VDC	12 VDC
12/24VDC Power Input		
Primary supply, DC input, normal operation	90 W	90 W
Supports 12V SLA battery charging	Yes	No
Voltage		
Nominal	24 VDC	12.0 VDC
Minimum	18 VDC	10.5 VDC
Maximum	27 VDC	14.2 VDC
Current		
Maximum normal load (90 W)	3.8 A	7.5 A
Maximum fault, peak (120 W, <10 s)	5.0 A	10.0 A
Battery Input		
Voltage		
Nominal	12.0 VDC	N/A
Minimum	9.0 VDC	N/A
Maximum	14.2 VDC	N/A
Cut-Off	10.5 VDC	N/A
Current		
Fused	8.0 A	N/A
Load, maximum	6.0 A	N/A
Charging, maximum	1.5 A	N/A

Description	Voltage	Current
Aux Pwr & Lock Pwr Output		
Nominal	13.8 V (24VDC) 12.0 V (12VDC / Batt)	1.15 A (total)
Maximum	14.2 V	3.3 A (24VDC) 4.0 A (12VDC) 5.0 A (Batt)
External Siren / Internal Siren / Strobe Output		
Nominal	13.8 V (24VDC) 12.0 V (12VDC / Batt)	1.15 A (DC mode)
Maximum	14.2 V	6.0 A
Comm 1 & Comm 2 Output		
Nominal (+12 V, 0V)	13.8 V (24VDC) 12.0 V (12VDC / Batt)	1.15 A (total)
Maximum (+12 V, 0V)	14.2 V	4.0 A
Maximum (D+, D-)	5.0 V	<200 mA
Serial Port		
Nominal (+12 V, 0V)	13.8 V (24VDC) 12.0 V (12VDC / Batt)	588 mA (total)
Maximum (+12 V, 0V)	14.2 V	1.0 A

Description	Voltage	Current
Nominal (RX, TX)	<500 mV	<20 mA
Maximum (RX, TX)	14.2 V	500 mA
USB power outputs		
Minimum output	4.7 V	500 mA
Maximum output (USB 1, Type A)	5.2 V	500 mA
Maximum output (USB 2, Type C)	5.2 V	1.5 A

Unloaded standalone current draw (must not exceed 3.5 A)[1]	
24VDC and Battery	97 mA
12/24VDC only (no battery connected)	97 mA
Battery only (no VDC connected)	170 mA
Current limiting, per output, according to Nominal rating	
Minimum cut-off	Nominal rating
500 mA, maximum	600 mA
1.0 A, maximum	1.1 A

[1] TSX10000 Discovery base current consumption (no peripheral devices fitted, EOL resistors fitted). Unit will shut down if this is exceeded. On-board fuses provide over-current protection for devices. Consider the maximum current draw from the devices above when calculating the total user current draw.

Table 10: TSX10000 Battery and wiring (in supported configurations)

Installed battery must be compliant with at least one of the listed standards (see Appendix A)	
Battery Type	Sealed Lead Acid (SLA) or Valve Regulated Lead Acid (VRLA) (rechargeable)
Terminal voltage	
Nominal	12.0 VDC
Maximum	14.2 VDC
Size & Capacity	
7 Ahr (fits all TECOM enclosures) (W x L x H)	65 x 151 x 100 mm
12 Ahr (for large enclosures) (W x L x H)	98 x 151 x 100 mm
Discharge current limit, Minimum	6.0 A
Charging current limit, Minimum	1.5 A
Terminals: Quick connect tabs	
Direct (W x t)	4.8 x 0.8 mm
With adaptor (provided) (W x t)	6.3 x 0.8 mm
Installed orientation	Must comply with vendor requirements.
Example parts	Power-sonic PS-1270 Power-sonic PS-12120
Battery cable length, Maximum	1 m long (inside enclosure)

Battery cable wire size and terminals	1.5 mm2 conductor (AWG16) 2 circuits providing DC voltage. Insulated, 4.8 mm quick connect terminals for battery, ferrules over stripped ends at Discovery module. In-line fuse in positive lead close to battery.
Battery cable fuse	M205 (5 x 20 mm) Time lag (slow blow)
Current	8 A
Voltage	250 VAC
Example parts	Bel Fuse 0655R8000-19 Schurter 0034.3126 Shanghai Fullness GTL1800200

Table 11: TSX10000-PSU1, Power Supply Unit 24VDC 120W

Manufacturer	Xing Yuan Electronics Co. Ltd.
Model	XY120LH-2400500VQ-DD
Safety and EMC Requirement:	IEC/EN61558
EMI standard	EN55014
Waterproof rating	IP20
Supply voltage	240 VAC
Supply voltage frequency	50 Hz
Input current	2 A
Output voltage	24 VDC
Output current	5 A
Output power	120 W
Storage temperature range	-10-+80 ˚C
Operational temperature range	0-+40 ˚C
Operational & Storage humidity range	5 – 90 %
Mounting requirements	Indoor room location, floor, wall, or shelf. MUST have free air flow around enclosure MUST NOT be located in structural cavities (wall or ceiling spaces, etc) MUST NOT be located in the Discovery enclosure DO NOT drill housing DO NOT affix or support using adhesives or tapes DO NOT hang by the AC or DC leads
Module dimensions [L x W x H]	168 x 66 x 40 mm (excluding cables)
AC lead length	1.5 m (nominal)
DC lead length	1.2 m (nominal)
DC terminal polarity	Red = Positive (+24 VDC) Black = Negative (0 VDC)

Installer-supplied Power Supply

Table 12: Fundamental requirements for installer specified power sources.

Compliance:	AS/NZS 62368-1 or equivalent.
Overvoltage category:	II
Enclosure earth	The external 12VDC or 24VDC sources will require enclosure safety earth and bonding points to be provisioned by the installer. As per page 16.
Environmental specifications:	Compliant with custom installation environment.
Output power:	120 W (nominal)
Output voltage:	24 VDC or 12 VDC, per Discovery module specifications in desired operating mode. Refer to Table 9 TSX10000, Discovery module, power input / output on page 64
Output Current, minimum:	5 A or 10 A, per Discovery module specifications, in desired operating mode. De-rate for specific operating environment, per module specifications.